

Law Offices
Irving Eisenberg
439 N. Clark St.
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DODI VE-NECHDI

(UNCLE & NEPHEW)

Law Offices
Irving Eisenberg
439 N. Clark St.
Chicago, Ill. CE. 6-5220

The work of

BERACHYA HANAKDAN,

Now edited from MSS. at Munich and Oxford, with an English
Translation, Introduction etc.

to which is added the first English Translation from the Latin
of ADELARD OF BATH'S *Quaestiones Naturales*.

BY

HERMANN GOLLANCZ, M.A., D.LIT.

Goldsmid Professor of Hebrew, University College,
University of London.

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To his brother
Professor SIR ISRAEL GOLLANZ,
Litt.D., F.B.A., etc,
in affection and regard for his high qualities
of heart and mind

This volume is dedicated
by the author
in the hundredth year of the birth
of their father,
the Reverend Samuel Marcus Gollanz.

1920

PREFACE.

In submitting this volume to the attention of those interested in Hebraic studies connected with physics, philosophy and religion, I have much pleasure in acknowledging my indebtedness to Dr. A. S. Yahuda, Professor at the University of Madrid, for kindly help and suggestions in my endeavour to fix the Hebrew text. I desire, further, to record my thanks to my sister, Miss Emma Gollancz, formerly of Newnham College, Cambridge, for her unfailing devotion in the task of revising the proofs of the English portions of my works.

H. G.

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INTRODUCTION.

Introduction.

Among the studies that have engaged my attention since in 1902 I published the "Ethical Treatises of Berachya," one of the most fascinating has been that of his "Dodi Venechdi" (*Uncle and Nephew*), in MS. whole or in part at Munich, Oxford, Leyden and Florence.

In my Introduction to the above-mentioned edition, I promised to give to the world the latter work; but other absorbing interests, and especially the heavy professional demands on my time, rendered the execution of my plans in this respect almost hopeless. However, having already when engaged upon the larger work personally transcribed the Munich MS. (No. 42) for the purpose, and collated it a second time at a later period, I did not give up the hope of once being able to produce this somewhat curious work, the "Dodi," and I now feel a satisfaction in being able to redeem the promise I made many years ago.

What invests this work with an enhanced interest, is the fact that it is not an original thesis, but it reposes more or less upon the work of that prolific writer, *Adelardus Bathoniensis*, Adelard or Athelard of Bath, to which has been given the name "Quaestiones naturales."

I use these words advisedly; for although all writers who refer to this work of Adelard's give it this name, it seems to me, having the only printed edition (15th cent.) before me, that this may not be the original title of the work, but simply descriptive of the subject-matter with which the treatise deals. It is for this reason, if I may anticipate the very tantalising problem, which has cropped up in the course of my investigations, that it is difficult to determine absolutely (although so towering an authority as Steinschneider speaks with dogmatic certainty to the contrary) as to whether, in addition to the Latin version, which is the only

one known, Adelard himself, or someone else, may not have written a French version, a resumé or adaptation of this self-same work. Though I have in vain made search for such a French version, I personally am not at all sure that, by some chance, one may not yet be discovered under a quite different title.

Such a discovery would clear up a very important point, for it would explain the cause of the great discrepancy which exists in the order, the length, and the language of the various Hebrew adaptations of the "Quaestiones" as they appear in the much fuller Munich MS. on the one hand, and in the fragmentary or briefer MSS. at Oxford (evidently identical with that at Florence) and Leyden. In fact, Bloch thinks that while the rendering of the fuller form was made from the Latin, the abridged seems rather to have been made from the French. Steinschneider traverses this opinion, saying that no proof is given for the assumption, the French words which occur here and there not justifying such assumption, as translators from Latin not infrequently substituted a vernacular form, or it may have been the copyists who did so.

In the absence, therefore, of such discovery—and there is only the most slender suspicion of any such French version existing—we are thrown back upon the Latin original of Adelard, not reprinted since the first edition in 1480, and certainly never yet rendered into English.

My prime concern was naturally the editing and translating of Berachya's "Dodi Venechdi" (*Uncle and Nephew*); but, in order to prosecute a comparative study of Berachya's Hebrew version and Adelard's Latin original, I deemed it both useful and necessary to prepare also an English translation of Adelard's Latin, and to incorporate in this volume the first English rendering of these "Quaestiones naturales."

The earlier Hebrew Bibliographers, though referring to Berachya's other works, do not seem to have known his "Dodi," and there could therefore be no question with them as to its origin.

In the article on Berachya in "Les Rabbins Français" ⁴⁹⁰ (Renan-Neubauer) 1877, there is a reference to Berachya as the translator of the "Quaestiones naturales" (of Adelard), and the writer remarks that "according to M. Bloch, we ought to ascribe to our Berachya questions on physics, under the

form of a dialogue between an uncle and a nephew, found in No. 42 of Munich. The treatise is entitled: "My uncle and my nephew, 'Dodi ve-nekdi.'"

Steinschneider had already in his H.B. (IX p. 92, 1869) remarked, that the celebrated author of the Fox Fables based his dialogue between uncle and nephew upon the "Quaestiones naturales of Adelard of Bath,"—a sort of free translation.

What elements of originality there are in Berachya's work, and to what extent it is a "very free and rhetorical paraphrase" (Steinschneider), if one can call it such, will best be judged, and only be judged from a comparison of the two Hebrew versions (the Munich and the Bodleian, now printed as far as I know for the first time) with the translation of Adelard, contained in this volume.

I can scarcely subscribe to the statement, that "though it is well understood the translation of Berachya is not literal, nevertheless, save for Biblical and Talmudic additions, *it does not depart much from the original.*" To one who has had the advantage of having the full texts of both before him, and has made a thorough study of the subject, it does seem to depart in many respects from the original. The entire treatment on the part of Berachya is different from that of Adelard, one according to his own ideas as a Jew, writing not so much from the physical, scientific, or philosophical side, but what to him was of greater importance, from the spiritual and religious standpoint.

In many, or, at all events, in a large number of the sections or chapters, Berachya has done little more than borrow Adelard's headings or questions, which he uses as a peg, and then formulates the replies to such questions in his own independent method and manner. Towards the end of this Introduction, I shall give a general indication, chapter by chapter, of the relationship between the two versions.

There is some truth (but it has to be qualified) in the remarks (Steinschneider, H.B. p. 85, xiii), "that in regard to Berachya there is no doubt that two works at least, the Fables and the Dialogue, he composed from Christian sources; for the compilation of Jewish material he also made use of Christian ones. In this relation, Berachya enters the circle of those who were the intermediaries for the Jews of Christian culture and literature, and furthermore affords

us the proof that the political and social ostracism existing in Christian lands did not have the effect of preventing those thus excluded from taking their share of the spiritual possessions."

Between the tenth and eleventh chapters of this work according to the order in the Munich MS., there appears the following confession on the part of our author: "I, Berachya, son of Natronai, was worried in thought till I girded my loins, and translated these subjects into Hebrew. I found them in non-Jewish writings, translated (*or* copied) as they were from the Hebrews (*read* 'Arabs'). In them were concealed matters coming from the wise men of our age, whilst the splendid knowledge of the expert was not even looked at by the eye of the untutored. Now when I saw such splendid wisdom placed in front of (*or*, 'restored to') you in an ugly setting, (*or*, 'such splendid wisdom, with nothing objectionable in it, restored to you'), I cleansed it from the hand of the Gentile, and wrote it out in the Holy Language, which is so dignified in tone. Now this is a dialogue between two contemporary scientists, an Uncle and a Nephew, being their contention in a style, refined and purified."

It cannot be determined from whom the numbering of the questions in Adelard and Berachya originated—the latter only as far as the Munich MS. is concerned, since the numbering does not occur in the other MSS. Steinschneider holds that it is often the work of the copyist; and thus might be explained the variations in the divisions and combinations of some of the Questions in the present work; we can scarcely regard such deviations as arbitrary; even a wrongly bound copy of the original might serve to explain why, *e.g.*, Chapters I.—VIII. of Berachya and Adelard XLVII.—LIV. change places.

I am able to confirm this surmise from very recent experience. It is perfectly obvious that in the Bodleian MS. of Joseph Kimchi's *Shekel Hakodesh* ("The Holy Shekel") which I have just edited, some of the leaves were misplaced and wrongly bound together, and proved somewhat perplexing to me, until I was able to find out their proper place in the work.

Adelard discourses in his work, in the form of a dialogue between Uncle and Nephew, on various branches of

Natural Science, treating his subject from the point of view of "Arabian" philosophy. The questions embrace plants, animals, man, and also the physical conditions of the Universe.

As for Berachya's adaptation (for that is the most that we can admit of the inter-relation between the two versions), this is the verdict passed upon him by Steinschneider (H. Ueb. p. 464):—

"The translator (!) availed himself of every possible freedom by omitting, adding and altering. In particular, he has changed the simple introductory phrases of the interlocutors, which give the clue to the connection between the various questions, into rhetorical tirades. He uses rhymed prose and the so-called *musiv*-style (the application of Biblical passages and phrases) with more dexterity and spirit than taste." We can scarcely believe that the learned Professor ever had the complete work before him; and he seems, moreover, to have been dependent upon some careless copyist for the samples of the work which he did have. Otherwise, how shall we explain the following transcription which appears in the *Letterbode* VIII, 35?

האדם נקרא בלשון ערבי (!) בהמות ובל' יוני בהמת הקן (!)
homo quidam animal *rationale*?

The passage should have been (cf. M. XX)

האדם נקרא בלשון ערבי בהמות המישור ובל' יוני בהמת הקן

And what shall we say of the glaring combination of errors copied by Joseph Jacobs in his otherwise valuable publication, "The Jews of Angevin England," 1893, pp. 196-198? These are his words: "Man," he says, *is in the Arabic tongue Behemoth, and in the tongue of Javan [Greece] the beast of the West,* a curious perversion of "animal rationale" (see Steinschneider in *Letterbode* VIII, 35). We now see where the "perversion" lies. This carelessness is particularly to be observed in several of Jacobs's references. It is the risk incurred when a writer does not go to original sources, and the error is thus carried on from author to author.

I regret, first, that Jacobs should have published (p. 196) the passage containing the personal reference on the part of Berachya which appears in "*Les Rabbins Français*, containing the objectionable words "and pearls before swine."

The Munich MS. has no such expression, as can be seen on referring to the corresponding passage (quoted above), and I doubt whether Berachya himself would have used them. A Hebrew scholar can easily account for the insertion of so grotesque an expression by the carelessness of a copyist. And this view seems to be shared by the writer of the article in the *Rabbins*, who had the critical acumen and fine feeling to leave these words untranslated. But I scarcely think that I could adduce a better proof in support of this my contention than the fact that Berachya in his larger work, which I termed the *Compendium* (see my "Ethical Treatises of Berachya, etc.," 1902) uses the following evenly-balanced and moderate terms in speaking of the literature of those not of his Faith. He there (Cf. XLIX., p. 92, Eng.) remarks: "I have culled all this information from the learning of the Greeks, which had been translated into other languages by certain non-Jews; I have redeemed it from the hand of the stranger, and have given it a purer turn of my own, and have incorporated it in this work."

Next, in Question LII. (which should be LIX.) Jacobs interprets "grêle" by *grasshopper*. It would have been impossible for him to make this unpardonable error, had he consulted the original. In the Munich Codex, the word occurs five times (also in the Index), and is explained in the text by קר which can mean nothing else but "ice" or "cold"; *grasshopper* is, therefore, out of the question, and wrong.

"He leaves out all proper names like those of Socrates, Aristotle, etc." A statement rather unfortunate, as Aristotle is mentioned by name in both the Munich and Bodleian Codices (M. VIII.; Bodl. 34.).

And why refer to the colophon of another work, that by his son Elijah, to confirm the authorship of the work referred to, when the name "Berachya" as the author occurs three times in the "Dodi" itself, once as the "Son of Natronai"?

And so also even the communication from Dr. Perles, alluded to in the article of "Les Rabbins Français," is wrong; for the 52nd question is to be found in the Latin, though not under a separate heading, which misled Perles. I found it as the second portion of Ad. LXI.

As regards Adelard of Bath—Berachya's original, and the circumstances under which he studied and wrote, a list of the works attributed to him, and a specimen of the Latin text, I refer the reader to an interesting notice by Thomas Wright in *Biographia Britannica Literaria*, or *Biography of Literary Characters of Great Britain and Ireland, Anglo-Norman Period* (1846).

It may be of interest if I here quote some passages from that article. "Athelard is the greatest name in English science before Robert Grosstête and Roger Bacon. His name would lead us to believe that he was of Saxon blood. He was born probably in the latter part of the 11th century, and first quitted England to study in the Schools of Tours and Laon. In the latter place he opened a school, and had among other disciples his nephew, to whom he appears to have been affectionately attached. But Athelard's love of knowledge was unsatisfied with the state of science in France, and he left his school, and crossed the Alps to Salerno, from whence he proceeded to Greece and Asia Minor, and it is very probable that he went to study among the Arabs in the East. Baghdad and Egypt were then the seats of Arabian literature. On his arrival in his native country after an absence of seven years, the throne, he tells us, was occupied by Henry I.; and one of the first books he published after his arrival, being dedicated to William, bishop of Syracuse, must have been written before 1116, the date of that prelate's death. This tract, which bears some resemblance to the Judgment of Hercules by the Grecian Prodicus, and which is entitled *De eodem et diverso*, is an allegory, in which Athelard justifies his passion for the sciences; he introduces Philosophy and Philocosmia (or the love of worldly enjoyment) as appearing to him on the banks of the Loire in the form of two women, when he was a student at Tours, and disputing for the possession of his affections, until he threw himself into the arms of Philosophy, drove away her rival with disgrace, and entered on the path of learning with that ardour which induced him subsequently to seek instruction even amongst the distant Arabs."

(Perhaps I ought in fairness to state here, that the theory has been put forward that the whole reference of a journey to the Arabs is to an imaginary journey, not a real one—an

invention to give more colour to his views on philosophy).

"It appears that after his return from his travels he opened a school, probably in France or Normandy, where he taught the Arabian sciences. These were still new in the West of Europe, and were decried by many, and among others, as it seems, by Athelard's nephew. Athelard wrote one of his most popular works, the *Quaestiones Naturales*, to oppose this prejudice, and to give a specimen of the doctrines on natural history which he had brought home. He reminds his nephew how, seven years before, when he had dismissed him (then a mere youth) with his other disciples, it had been agreed between them, that he would himself go and seek the learning of the Arabs, and that his nephew should in the meantime make himself master of all the science which could be found among the Franks. In reply, the nephew is made to express a distaste for his uncle's Saracenic doctrines, and for the extravagant terms in which he spoke of their superiority over the old studies of the western schools. Athelard then proceeds to defend his opinions on this subject, and provokes his nephew to propose what were considered some of the most natural questions in natural history. The manner in which Athelard speaks of the reception of the Arabian sciences seems to show that they were then quite new among the Christians of the West, and to contradict the opinion founded on a legend preserved by William of Malmsbury, that they had been introduced long before by Gerbert.

"We know nothing more of Athelard's personal history. His celebrity was great in after times, and in the 13th century Vincent of Beauvais gives him the title of *Philosophus Anglorum*. His writings appear to have enjoyed a great popularity. We may divide them into two classes, original works and translations from the Arabic."

Adelard's *De eodem et diverso*, to which reference is made above, appeared for the first time in the Latin original, together with an analysis and a historico-critical study, in 1903. It was published in the fourth volume of the "Beiträge zur Geschichte der Philosophie des Mittelalters," the author being Dr. Hans Willner. It is a well-reasoned and illuminating contribution to the history of the philosophy of the Middle Age; and it is of additional interest in showing that

the main ideas on certain aspects of life, specially of the higher life, running through the "De eodem" are those to be met with in the "Quaestiones."

To summarise this critic's conclusions in his own words as near as possible: First, as to form of composition, there is a mixture of prose and poetry, though the former far prevails. The dialogue itself is to be an incentive to the nephew to strive after the higher spiritual knowledge, to throw himself with fervour into philosophy, the difficulties of which Adelard by no means minimises.

Adelard's works reflect the influence of the condition of the times in which he lived, and of the philosophical theories of his day; and he uses of that material what appears in harmony with his system. Scarcely original and creative himself, he is at pains to reproduce the old teachings of philosophy in a manner according with the knowledge of the hour. The influence of Plato colours his entire system, and his Platonism has its roots both in Augustin and Boethius. He came into contact with the Oriental-Arabic sciences, such as mathematics, physics, and medicine, and they had a remarkably strong influence upon him.

The criteria of truth can only be established by reason, not by sensation. The spiritual power of the soul, which stands higher than the emotional, is able to raise the phenomena to a higher degree of knowledge, namely, truth. Reason is subject to no deception like the Senses; it leads and guides its servants, the external sensations, which it rules and masters. The soul, on the one hand, is the means of teaching us knowledge of the existence of objects, their origin, etc., and on the other hand, by means of reflection, she gets to know herself, to know reason and intelligence.

The power to attain to absolute truth is denied to ultimate reason; but what is denied to the weakness of man is reserved for God alone.

As in all cosmological speculations of the Scholastics, so also with Adelard, the dogma of the Creation of the world is the ground-work of our knowledge concerning the world. The world and its ultimate principles are not, as with Plato, eternal, but created. Matter in itself is lifeless and heavy, a passive substance, capable of no movement, possessing no sensibility. In consequence of the absence of

this power of self-movement, it must receive the impulse from an external cause. Its life is the work of a special spirit which gives it activity, and renders the substance capable of development. Matter obtains its form in accordance with divine ideas; and hence the Universe becomes a creation of the Omnipotence, Wisdom, and Goodness of God.

Mathematical order and unity,—the soul of the Universe or Nature,—are God's creations, subject to Him and dependent upon Him, yet, in regard to the world of matter, exercising their power and dominion over it. They are the principle giving soul to the upper spheres of the Universe; not only, therefore, are the constellations under their guidance, but also matters of earth, including man, are determined by them.

And as for the constellations themselves, they not only exercise purely physical functions, but they also possess secret, spiritual powers, by virtue of which they influence all the events and fortunes of man. They are living substances, of divine nature, after whose pattern all else is created, spiritual existences intermediary between God and man, placed over creatures of the material world. Hence, from the knowledge of the movements and attributes of the stars inferences may be drawn regarding the past, present, and future forms of the sublunary world.

The soul is not divisible; it is not material; it is absolutely one, knowing neither increase or diminution. She alone gives movement to the body; through her arise sensations and perceptions, and also spiritual knowledge. The senses are but the instruments used by the soul to grasp that which can be perceived and retained. In the soul alone—God's creation—is the unity of the human organism established.

Having regard to the perceptive activity of the soul, Adelard distinguishes six faculties—*sensus*, *imaginatio*, *opinio*, *memoria*, *ratio* and *mens*. To man the *ratio* specifically belongs, by which he distinguishes himself from the brute. Relying on Plato, and in agreement with the philosophy of his time, Adelard speaks of a three-fold soul, the rational, animal and vegetative. The rational soul is located in the head, the functions being distributed among its various portions, *imaginatio* in the front, *memoria* in the

back of the head, the middle of the head being reserved for the *ratio*. The seat of the animal soul is in the heart; and that of the vegetable soul in the liver (according to Plato, in the abdomen). Through the blood we get the right proportions in the mixtures of the four chief moistures of the organism, the humours, each of which has its special seat. Yellow gall and black, blood, and mucus have each two of the distinctive qualities, warm, cold, moist and dry, being either warm and dry, cold and dry, warm and moist, cold and moist.

Adelard was the first to make accessible to the West, by means of translations, the knowledge of the writings of Galen, as of the Arabic and Jewish Physicians.

Body and soul are two completely different substances, their junction being purely external and accidental, as they bear the impress of attributes totally opposed, combination and change characterising the body, simplicity and eternity the soul. By virtue of her origin and powers, the soul governs the body which she protects. She existed before and without the body, and in her pre-existent state of pure spirit, free and untrammelled. By her entry into earthly life, she is subjected to conditions of existence totally different; she is incarcerated in the body as her prison-chamber, so that she is limited in her spiritual uplifting, many defects attaching to her, and rendering her clear outlook blurred and weak. The soul's striving to ascend out of the world of matter into the intellectual region, and thus to reach the highest perfection, is an effort to regain her former condition. The soul's mandate when joined to body, is to restore to the body its right and proper measure, and to preserve its equilibrium; but the soul in her earthly course falls from her high estate of spirituality and purity into the low depths of materialism; her original, natural, and good dispositions are thereby converted into the opposite; even the *ratio* loses its hold and rule through the influence of the body."

In order to gauge the general structural differences in the two works, the "Dodi" of Berachya and "Quaestiones" of Adelard, I have supplied in the translation to the former work a cross-reference at the head of each chapter, which will make the comparison easy, and certainly more vivid than any brief and bare summing-up on my part in this

Introduction. I, accordingly, refer the reader to these indications, believing that a close comparison of the two versions will amply repay those interested in this part of the problem.

Without, therefore, dwelling upon the revelations which such comparative study will afford, I pass on to the next point, and ask: How far has Berachya adopted the philosophical theories of Adelard, or rather introduced them into his "Dodi Venechdi"? In which points, specifically, do the views of Adelard and Berachya intersect?

It will probably be readily conceded that the strongest agreement will be found on the psychical and ethical sides, but that Berachya brings out such points into much bolder relief than Adelard.

To cite a few examples. Compare Berachya in Chapter XIX. with the corresponding passage in Adelard. He here dilates on the difference of soul in man and brute, and draws the fine distinction between *Nephesh*, *Ruach*, and *Neshama*, which is naturally quite absent in his original. Again, compare Berachya's Chapter XL. with Adelard's XXXVIII., and a striking difference will immediately be observed. There is coldness in one, whilst there is warmth in the other. Berachya, in the course of answering the question propounded, takes occasion to soar higher and refers to "the three worlds," the lower, including plant life and man; the middle, containing the heavenly hosts; and the third, inhabited by the ministering angels, from whom is derived the soul of man. Man's soul, he says, is high above the lower world; and if she leaves the desires of this world, she will rise; he explains, further, the composition of the soul, its upward glance, and the erect stature of man, ever looking heavenward. This idea is similarly expressed in his "Ethical Treatises": see my edition, Chs. XLVI. (On man's dual nature); XLVII. and XLVIII. (The soul's true essence; and interdependence of soul and body); XLIX. (The "Neshama"); L. (The soul "special and living"); LI. (The soul and body form one agent).

In LXII. (Berachya) and LXIX. (Adelard), as in XI. (Berachya) corresponding to I. (Adelard), there is in different language the clear confession on the part of both, that as the plant is the effect of the Divine Will, so Sun and

Moon are God's creations, implying that, contrary to the view of Plato, all things are created, not eternal.

Quoting Saadya Gaon, Berachya says distinctly in the "Compendium": "The soul is created and renewed, just as other substances are created and renewed; . . . it is a pure essence . . . illuminative in a higher degree than the heavenly spheres and bodies generally." (p. 88.)

As an instance of folk-lore, Berachya introduces into Chapter XIII. the name of *Lilith* as a creature of air, and *Salamander* as the product of fire. Adelard, on the other hand, does not mention such by name.

Berachya refers to the following names of persons and places in the course of his treatise: Alexander, Aristotle (M. VIII.); Ibn Ezra (M. X., XIX., LII.); Parchon (M. IV., LV.); Hagarites, Arabians, Ishmaelites, Wise men of Arabia, Wise Men of Tabor (M. IV.); Cuthim (M. IV.); and to himself (X., XIX.); Jerusalem, the Land of Cush, Egypt, Land of the Hittites (M. VI.); Tyre, Zidon, Philistia (M. XXXV.); Zoan (M. XXXVII.); The Hot Springs of Tiberias (M. XLVII.); and Rameses (M. XLVIII.); Africa and "the Great Sea" (M. VIII.).

If only from a purely philological point of view, it is interesting to call attention to the following (Hebraicised) French words appearing in Berachya's version, and used by him by way of explanation.

They are:—

- אונטייה *ente*, graft (Bodl. 3; M.XIV).
 גאיש *gois*, stomach (Bodl. 7).
 גזיר *gesier*, gizzard or crop (Bodl. 7. M.XVII).
 גאנה *jaune*, yellow (Bodl. 9, M.XVIII).
 פירלש *pearls*, (M.LVI).
 גרייל *grêle*, ice (M.LVII. פתותי קרח הנעלו גרייל"א)
 פולדרין *foudre*, thunderbolt, (M.LIX).
 צרליאון [?] *créon* crayon) meteoric stone, aerolite (do.)
[?] *sérion*
 שופלייט *soufflet*, bellows (Bodl. 22).

Adopted expressions such as איסטומכא (*stomach*) (Bodl. 7; M.VII) and מירנקוליאה (Bodl. 4), מילקניאון (M.XV) *melancholic*, and perhaps אלכסון (M.LXII) should also be noted.

Berachya further introduces the names of the planets and constellations, such as Saturn, Jupiter, Mars, Sun, Venus, Mercury and Moon (Ch. VI.), and in the last chapter he refers to the heavenly "Dragon" and to Cancer, sign of the Zodiac.

And now a word as to the MS. itself. Codex 42 Munich is a beautifully written conivolut; this part of the work (No. 2), the "Dodi Venechdi" (ff. 275-300 b) having all the headings in red ink, the introductory headings of the contents being alternately in red, green and black. The writing differs entirely from that in which the פתרון ספר האסמות וחרגה הבינות is written.

To refer in general terms to the relationship between Berachya's work and that of Adelard, we have to add, that Berachya omits Adelard's introduction with regard to his travels, his return to England, his reminder to his nephew how, seven years before, it was agreed between them that he (Adelard) should devote himself to the study of Arabic learning, whilst the nephew was to attend to the French methods, especially of philosophy, and the relative value of the two systems.

On the other hand, in all Berachya's chapters, in addition to the headings in terse language, the question is restated with an introductory address to "Uncle," generally in a flattering and persuasive style, often with a play upon words of some Biblical text. Thus each chapter in Berachya is fairly independent of the other, while in Adelard there is, generally speaking, a statement or clause at the end of each chapter connecting it with the next, and making an easy transition from one theme to the other.

Adelard I	corresponds to Berachya XI, which is twice as long, a paraphrase and not literal.
" II-V	XII-XIII.
" VI-VII	XIV-XV, similar in B., a free rendering.
" VIII-IX	XVI, " " "
" X	XVII, " " "
" XI	" Ad. has 'liver,' while B. has 'crop,' stronger than stomach for birds.
" XII	XVIII, which is longer.
" XIII-XIV	XIX. B. nearly twice as long, agreeing with Adelard's theory in the main as to whether "brutes have minds," but though similar ideas are common to both, B.'s is not a translation, and especially the latter portion, B. drawing his arguments from Scripture, attempting to show from philological distinctions between <i>Ruach</i> , <i>Nephesh</i> , and <i>Neshama</i> , that the term "soul" is applied to but man alone.

Adelard also in this chapter soars above his usual prosy level, and puts into the mouth of the Nephew the following words:—

"I will gird myself to higher themes . . . True, I am unacquainted with the idle vauntings of the Greeks, and have not seen the cave of Vulcan, yet have I learnt by practice to know the true and disprove the false. I want to discover what you think of human nature. You may magnify as much as you will what you have been saying previously, but if you do not know yourself, I think such things of small account: man's proper subject of discussion is man,"—(thus anticipating the sentiment of Pope: "the proper study for mankind is man.")

Adelard XV	corresponds to Berachya XX. The two fairly identical in ideas. B. more prolix, speaking of man as called in Arabic "animal of the plain (of equity)," and in Greek "animal of rule or measure"—not in Adelard's original.
" XVI	" " " (second part of XX) which, though not much longer, is yet much clearer and fuller than Ad. B. has not the reference to the "old man at Tarsus in Cicilia (<i>sic</i>)," but speaks of the blood-letters in reference to the healing of the body.
" XVII	" " " XXI, which is much longer and fuller in detail.
" XVIII (cites Aristotle's Physics)	" " " XXII, identical in sense and near in phraseology.
" XIX	" " " XXIII, fairly identical.

introduces Boethius, not in B.)	"	"	XXV, more explicit than Ad.
on sound)	"	"	XXVI, somewhat longer than Ad., adding query re "seeing through a wall."
XXII	"	"	XXVII and XXX, a brief and flimsy outline of Ad., and by no means a reproduction.
XXIII (introduces Boethius "De Musica," "De Consolatione," and the "Topica," also Plato's "Timæus.")	"	"	XXVIII, both short and fairly identical.
(reference to Plato)	"	"	XXIX, briefer and more succinct.
XXV-XXVI	"	"	XXX, practically a query of his own, scarcely traceable in Ad.
XXVII or XXVIII (refers to himself as a citizen of Bath; mentions Plato)	"	"	XXXI, similar.
XXIX	"	"	XXXII, quite different.
XXX	"	"	XXXIII, query not in Ad.
XXXI	"	"	XXXIV, phraseology different.
XXXII	"	"	XXXV, more vivid and historic in presentation, naming Tyre, Zidon, Philistia, while Ad. simply says "You were coming from the East."
XXXIII	"	"	XXXVI, fairly identical.
XXXIV (reference to Aristotelian principles)	"	"	XXXVII, an adaptation, with points of resemblance in language and argument.

Adelard XXXV (refers to "Saturnalia of Macrobius" and to Terence's saying "not to slay the slain")	corresponds to Berachya XXXVIII, an answer to the query which Ad. omits, and refers to explanation of Macrobius.
XXXVI-XXXVII	XXXIX, same idea expressed in fairly similar language.
XXXVIII	XL, which is longer and different,—the treatment of the question is ethical, and based on Scripture.
XXXIX-XL	XLJ, argument almost identical (the last sentence seems the reverse of Ad., end of XL).
XLI-XLII	XLII-XLIII, similarly expressed.
XLIII-XLIV	XLIV, which has a long preamble leading up to the question; the treatment generally much fuller than in Ad.
XLV	XLV, similar in idea, but different in expression, and twice as long.
XLVI (mentions Boethius "Conso- latio")	XLVI, a free paraphrase, with addendum seemingly out of place.
XLVII	L, similar reply, freely rendered, containing a smart application of Eccles. xii, 6, to the subject under consideration.
XLVIII	II amplified, also a reference to the Antipodes, not in Ad.
XLIX (mentions Statius, poet and philosopher)	III, similar, but no reference to Statius' views.
L	IV, expressed in more popular language; refers to himself by name, and cites Ibn Ezra's and Parchor's comments on Holy Writ. Ad.'s "Antioch" is B's "Land of Cush."
LI	V, a very free rendering.
LII (reference to Arctic and Antarctic regions; Caribbean Sea)	VI, though an adaptation of main ideas in a loose way, yet simpler; language and treatment different. References to "Wise men of Arabia," the "Great Sea," "the habitable globe, divided into three parts," "Jerusalem—the navel of the earth," "Egypt, Cush, land of the Hittites,—all absent in Ad. Influence of the Constellations.

Adelard LIII (Stattius, speaking of Phœbeus)	corresponds to Berachya VII, independent treatment.
"	"
LIV (very brief)	VIII, much more diffuse; interesting reference to Aristotle's advice to Alexander re sand-filter, not in Ad.
LV	IX, fairly identical, but more vivid.
LVI	X. Question not in Ad.; but a few lines at the end identical with Ad. LVI.
LVII,	XLVI (2nd part, which is misplaced) and XLVII. Not a translation; refers to Tiberias.
LVIII	XLVIII, story of water-bottle identical, but differently expressed; a reference to Ramesses and Zidon.
LIX (Stattius mentioned)	XLIX, similar treatment.
"	LX, a more scientific treatment than B. L., (only part of Ad.)
"	LXI, very bare in comparison with B. LI and LII (1st part), quite different treatment and phraseology, adds Ibn Ezra's explanation of Eccles. i, 6, and cites other Scriptural phrases re "the wind."
LXII	corresponds to Berachya LIII, similar in expression, though free.
LXIII	LIV.
LXIV	LV (introductory dialogue, citing Farchon's views, not in Ad.)
"	LVI (in parts slavish following of Ad.) and
"	LVII (fuller than latter half of Ad.'s LXIV).
LXV. (Stattius mentioned)	LVIII, similar language.
"	LIX, fuller, citing phrases from Job.
"	LX expressed in more popular language.
"	LXI, more vivid, and truer presentation.
"	LXII, similar ideas, but different treatment.
"	LXIX (reference to Socrates)

The last two sections of the Bodleian fragment (Chs. XXXV and XXXVI according to my numbering) are as far as I can find, traceable neither to the Munich MS, nor to Adelard's original.

The Hebrew text itself is far from perfect; in places it is very corrupt, practically baffling in some few instances all attempts at explanation. I have done my best in offering alternative readings, in order thereby to elucidate many an obscure passage. I do not claim that I have always succeeded even to my own satisfaction; but I may have stimulated speculation upon otherwise hopeless expressions and phrases.

Almost at the last moment I had the opportunity of consulting another copy of the Munich Codex, one belonging to the Halberstamm collection of the Judith Montefiore Theological College, Ramsgate (now deposited at Jews' College, London), but with no further result from the collation than to prove that this late copy was much more unreliable than the older manuscript.

From internal evidence we may hazard the conclusion that the copyist of the older MS. was also an Ashkenazi, perhaps a South German; at times he makes no difference between ש and ס ; to indicate the *Kametz*, he frequently inserts the ; and on p. 44 (3 lines from the bottom) we have ועכּה , for which I propose וּהַ , where וּ was evidently written for וּהַ . It is the copyist, who was not sure of his grammar or orthography, that is to blame; Berachya, who knew his Bible so well, that though quoting (as I showed in my larger work) from memory, he now and again confuses, or rather fuses, two Biblical passages, can certainly not be held responsible for the grammatical and orthographical errors which appear in the text of this work. An interesting example, by the way, of such wrong quotation, is to be found at the end of Ch. X. (p. 10 Heb.), where the words cited do not occur in the Bible: the author may have been thinking of Jeremiah IX., 4.

There is, again, a great difference in the clearness and directness of the Hebrew in the two MSS., the Munich and the Bodleian; the latter, fragmentary, is more terse and simple, and even more correct.

The reader of the "Dodi" cannot help being struck by the remarkably dexterous manner—occasionally carried to the point of daring—in which Berachya weaves into the text of

this work, as part of his natural style, expressions from Holy Writ which he seems to have made his own, quite distinct from direct quotations which he cites for purposes of elucidating his subject. I have in most instances indicated such expressions in the translation by the use of inverted commas.

In this volume I have deviated somewhat from the ordinary course, inasmuch as in place of the usual collection of Notes, I have added textual critical emendations in the body of the Hebrew text, either suggesting an undoubted or probable reading (marked l. or ?), or using the round bracket () to indicate that the word or expression therein contained has to be deleted, and the square bracket [] to imply that it has been added by me to make sense. I have further included in this Introduction such information as might have been conveyed by way of notes.

I will now, in conclusion, add the following few points to the information conveyed in the preceding pages.

In understanding the term דוקין, occurring in the Hebrew of M. XVIII. (Bodl. 8), it is interesting to note what Jewish commentators have to say upon the subject. Commenting on Levit. XXI., 20, *Rashi* explains the word דק thus: שיש בעינו דק שקורין מלא כמו הנוטה כדוק: מיל"א is the French *taie*, a dark spot or speck, a web or cataract in the eye. And the *Mincha Belula* has:—הלו" אמרו דק הוא: מום העין, ואין לו ריע במקרא וולתי הנוטה כדוק שמים: In the Talmud the term דוקין שבעין is found in Tr. *Bechoroth*, f. 28, and *Zebachim*, f. 85.

Another expression which proved rather tantalising is השמש אבני literally "stones of the Sun" (M., LII Heb.). At first sight it seemed at though "stones of the sun" meant "meteors," reminding one of the poet's words: "Yond light is not daylight It is some Meteor that the Sun exhales." But whereas in some connections אבן השמש might be another form of אבן השמים (aerolite), from the context of the work before us, it has to be taken as meaning "an atom."

And so I venture to read for כאבני השרה in M. LI (Heb.) השמש, regarding the present reading an error on the part of copyist. The author himself describes it as something

so fine that it is indivisible, which leaves little room for doubting that it refers to the "atom" or "specks of the sun."

Towards the end of M. LXII. (Heb.), the last three lines seem to point to an eclipse of the moon, which can only occur when the moon, the sun, and the earth are in one straight line; but the wording in the text is not quite clear. I have, however, translated the passage, as near as possible, as it stands, not wishing to deal too freely with the text before me. But I might add the following statement by way of supplementing the bald rendering of Berachya's words. He wishes to emphasise that while the sun is in the sign of Cancer at the midsummer solstice, we have intense heat; whereas "during the length of time" in the year, meaning, during the greater part of the 365 days, the sun's heat depends upon circumstances, and is greater or less according to his varying positions. But as regards the moon, her light is (apart from the changes in the course of her revolving round the earth within a month) "exposed to occurrences" which are extraordinary, when she is opposite to the sun (at full moon), and reaches one of her nodes, whereupon there occurs an eclipse of the moon. When, however, the new moon gets into her position near the sun at one point of the moon's node, and hides the sun's disc, there will be an eclipse of the sun.

Jewish astronomers of old expressed the idea of the moon's "ascending or descending node" by the words "entering the head or tail of the מלי or תלי (or תנין) heavenly Dragon," i.e., the moon's orbit. (See *Jehuda Ha-Levi's Kusari*, IV., 25, and the illuminating comment on pp. 341-9 by the Editor, Dr. David Cassel).

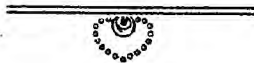
If we wished to criticise Berachya's theory, that "if the moon had a light of her own, we could not stand it, inasmuch as she is renewed month by month," it might be urged that if she had a light of her own like the sun, she would always appear as full moon, and would not be renewed at all. She would in that case simply be a sun of smaller dimension, and not necessarily revolving round the earth.

As regards the physiological terms and the healing art in general, to which reference is made in the Hebrew text, a mine of information is to be found in the work *Biblischtalmudische Medizin* by Dr. Julius Preuss, Berlin, 1911; and for astronomical data it will be useful to consult Rabbi Levi ben Gerson's *Milchamot Ha-schem* ("Wars of the Lord"), as well as the *Kusari* by R. Yehuda Ha-Levi, to which I have already referred.

At the head of each chapter in the translation of the Munich Codex, I have indicated the corresponding chapter (as I have supplied it) in the Bodleian MS., and also in Adelaar's original. I have further added the cross-reference to the Munich Codex in the Bodleian MS. This will facilitate materially the comparison between the three versions of the curious, albeit fascinating themes propounded in the *Quaestiones Naturales* of Adelaar.

May, 1919.

H.G.



Translation
of
Munich Codex (Hebrew).

This is the Book
called
"Uncle and Nephew."

I now begin, with the help of God, the Most High, to give heads of chapters of the book called "Uncle and Nephew," being the questions asked by a nephew of his uncle.

Question I.—Why does a man, when he falls into the water, sink like lead, while when dead he floats upon the water? We should expect the opposite.

II.—Why is the earth suspended in mid-air, and how is it maintained?

III.—If the earth were pierced, where would the stone fall which is thrown?

IV.—Why does the earth tremble?

V.—Why is sea-water salt?

VI.—Why do the waters of the sea spread over many places, and yet within a stated hour return to their original place?

VII.—Why does the Great Sea (the Mediterranean) not grow larger in consequence of the mighty waters, for do not all the streams flow into the sea, and yet the sea is not full?

VIII.—Why is there no taste of salt in the streams when they return from the sea?

IX.—Why do streams grow larger instead of smaller?

X.—Why do not the streams that flow into the sea grow less?

XI.—Why does grass spring forth without having been sown?

XII.—Why are products that spring from the soil called herbs, and not those from fire?

XIII.—Why do not plants grow in air, water, or fire, these being of the four elements?

XIV.—Why does a tree grafted on another bring forth fruit

according to the graft, and not according to the root, which grows from the earth?

XV.—Why do some animals chew the cud?

XVI.—Why do those animals that chew the cud, when they lie down, crouch on their rear side and hind legs?

XVII.—Why does not the fowl urinate?

XVIII.—Why do some animals see in the night, and others not?

XIX.—Have animals soul or intelligence?

XX.—We know that the ox has horns as instruments of protection, the wild boar has tusks, and the lion talons. Some animals have means of flight, so that they are nimble to flee from the pursuers, viz., their feet, as, for example, rams, conies, and hares. To man, however, the Creator has given something of greater advantage than these.

XXI.—Why are some clever ones forgetful, while at times the fool remembers?

XXII.—What is perception of form, memory, and judgment?

XXIII.—Why is the nose above the mouth?

XXIV.—Why does the hair fall off from the side of the face?

XXV.—Why is one sound heard by many people?

XXVI.—Why can a sound be heard from the other side of a wall, and yet we cannot see through a wall?

XXVII.—Why, of all the organs of a man's body, is it the eye that sees?

XXVIII.—Is breath real or imaginary?

XXIX.—Why has the eye the power to see the stars at once, and to bring them to view?

XXX.—Why does the soul receive the sensation of sight?

XXXI.—Why does one who looks into glass not see his face?

XXXII.—Why is one who stands in the dark not seen?

XXXIII.—Why are not the eyes at the back of the head?

XXXIV.—Why is the nostril the organ of smell, the palate the organ of taste, and the hand the organ of touch?

XXXV.—Why does a man weep at the time of joy?

XXXVI.—Why do both cold and warmth proceed from one and the same mouth?

XXXVII.—Why do people blow into a man's face to cool his heat?

XXXVIII.—How is it that the throat is able to bear greater heat than the mouth?

XXXIX.—Why are the fingers not of equal length?

XL.—Why does a child not walk at once?

XLI.—Why is a man first reared upon his mother's milk?

XLII.—Why does a man contract disease in the act of coition?

XLIII.—Why are women, cold by nature, more wishful for their husbands than the men are for them?

XLIV.—How is it that man parts from life, and dies?

XLV.—Why does one who has had his fill long for food in a short time?

XLVI.—Why are the living afraid of the dead?

XLVII.—How comes it that warm waters spring forth from the river?

XLVIII.—Why does the water come out of a vessel with a hole in it, if the mouth of the vessel be stopped?

XLIX.—Whence come the winds?

L.—Whence comes the first movement of the wind?

LI.—Can a small object move other things?

LII.—Whence come stillness and rest?

LIII.—Why does the wind blow stronger round the habitable portion of the globe than around the firmament?

LIV.—Whence has the wind force to produce noise?

LV.—Converse between Uncle and Nephew.

LVI.—Whence proceed noise and thunder?

LVII.—Whence comes the frost, called grêle, after thunder?

LVIII.—Whence proceeds the flash of fire, called lightning, at the time of a thunder-storm?

LIX.—Whence proceed the blasts of fire after thunder, and why do they not always fall?

LX.—Whence have thunder and hail the power to pierce a thing?

LXI.—Why is the thunder not heard before the flash of light is seen?

LXII.—Why is the jurisdiction of the moon circumscribed?

Herein he declareth that which is clear, and cleansed from the mean brings forth what is dear. How my heart for his words doth yearn and sigh! Without them all is blast, barren, and dry. Day by day will I stake my thirst at the refreshing words of his mouth.

QUESTION I.

[Bodl. 31; Ad. XLVII.]

And now, Sire, deign to inform me why a man falling into the water sinks like lead, whilst when dead he floats: we should have expected the contrary, as a dead body is heavier than the living.

UNCLE.

'Tis a hard matter that has been labouring to death in your tenement of clay, yet from the body of the lion honey hath flowed. Now, my nephew, to answer your enquiry.

Everything depends on nature; in man's inward parts life is stimulated: and it is necessary for the living being to be impressed with the nature of his origin. If you do not recognise this fact, there is a possibility of your remarking that your constitution is changing.

Do you not know that in man's body there are four basic elements, viz., fire, air, water, and earth, each of these being by nature warm, dry, cold, or moist? Everything derived from fire is warm and dry. Now the warm and dry in man's body are enclosed in the gall, and it is the way of the warm and dry to tend upwards in proportion to their power and origin, for they belong to the lighter arrangement. While the warm and dry are enclosed in their compartment, viz., the gall, which is light, they do not give the members of man's body a chance of floating upon the surface of the water. Once, however, the compartment is broken open (*cf.* Eccles. xii. 6: "Or ever the silver cord be loosed, or the golden bowl be crushed, or the pitcher be broken at the fountain, or the wheel be dashed to pieces at the cistern," meaning "the gall," which is dashed against the liver, the source of the blood), the heat and dryness depart to support all the members of the human body, and the lighter element thus free is spread through every part of the body to the various members, and they are borne upward.

QUESTION II.

[Bodl. —; Ad. XLVIII.]

Uncle! I said within my heart, I would hide my views so as no longer to set my face against thine, lest I weary thee by my questions. But as I applied my heart to desist therefrom, the fire kindled within me, and in the desire to acquire knowledge, my tongue is stirred to ask, Why is the earth suspended in mid-air, and how is it kept there? For the earth bears every weight upon itself, like wood and stone, which hath support but from her (the earth); the air does not support such, since it

is heavier in its constitution than they are. Furthermore, air surrounds on all sides. Now if you were to answer that the earth, not deriving its support from the air, must needs fall, according to ocular observation such a plea is untenable.

UNCLE.

I will answer you according to common sense, not according to ocular observation. Understand well. Why should we say that the earth would fall? If it contained within it a cause for falling, we shall fall with it. No, indeed, "the earth is suspended on nothingness"; and in our hearts is implanted the sense to know that the earth is heavy by reason of its basic elemental properties.

Everything is attracted to its original kind; it has a sort of intelligent fondness for it; for all things have a liking for their own kind, and are drawn on to find their support in the matter to which they cling. For example, earthy things incline downwards, by which is meant towards the pole, called the earth's limit, as there is nothing below it; since as regards that part of the earth which you think beneath the pole, if people could walk upon it, their feet would be opposite the feet of those who walk upon our part of the earth, on the middle of the earth's sphere. Now that point cannot be shifted, and is fixed in one place. All formations of the same kind gravitate towards this middle point; and since it partakes of the nature of its own kind, and is not divided or separated from it, it necessarily follows that as all things hasten by reason of their weight towards it, falling objects will fall thither; their weight and momentum cause them to gravitate towards the lowest point, which is the pole, fixed as it is; and they are not detached from the place where they are found, unless parted by force, as when stones are hewn, or trees felled, or minerals dug out. As regards the pole, you cannot speak of anything as above it; by its nature the pole attracts to it every object that has weight.

You will now see that the cause why things fall is not to be found in that which you thought; on the contrary, the earth supports every existing object of weight; and the reason, or prime cause, is derived from that very support which things receive, and not from their elemental properties. But there is a secondary cause which has to be reckoned with, and that is, the object with which it is connected by nature, the lowest point to which it is attracted, than which there is no lower point, nor one that vacillates. It is fixed in the middle of the earth. As for the stars and luminaries, it is their nature to draw their original generating moisture equally from the four sides (of the universe).

QUESTION III.

[Bodl. —; Ad. XLIX.]

If the earth were pierced, where would the stone that is thrown fall?

Nephew: I understand part of your words; but tell me, according to your contention, suppose the lowest point of the globe, the pole, were pierced to the very bottom, so that one could see from the air on the earth to the air beneath the earth, and one threw a stone through the aperture, where would it fall and rest?

Uncle: That which setteth a bound and term to the earth's movement will cause the stone to rest, and it will not go beyond the aperture.

Nephew: Not so; but the stone will rest in the middle of the earth's crust. This I have found in the book on Physics; but I know not why it is so.

Uncle: Those statements are true. I will now instruct thee why they are so; and then thou wilt understand the secret of the stability of the earth, and the problem as to whether the stone goes, and finds its rest. Thou hast often heard that whatever is fond of its kind flees from that which is not of its kind. For example, fire, whose tendency is to go upward, being of a higher endowment, flees from dust, which is of the very opposite nature. In like manner, all similar things will rise upward when of the same constitution. Thus, that which appears to thee the middle of the earth, when you pierce that spot alone, the earth actively shuns all other natural constituents, for it consists solely of the element of dust; while from the point from which you begin to bore to the spot in which it stops, it is composed and made up of the four fundamental elements; and so as regards the middle, as well as below unto the earth's limit, it is compounded of the air beneath, made up of the four elements. Therefore, if men throw a stone into the hole of the globe, *i.e.*, into the middle, it will rest there in the middle, the spot being solely of the nature of dust; it will not rest above that spot on account of the nature of fire, which flees from it, as it is not of its own kind. And just as the air above the earth will not send forth the stone, because that which is mixed with it has fire as one of its elements, so will the stone which is thrown not go down, or pass beyond the spot which partakes of dust alone; there in the middle it will rest; for one reason, on account of its weight, seeking as it does that thing to which it is attracted; and secondly, on account of its fleeing from that which it resists, something light, *viz.*, the air, which is above it in pedigree. It, therefore, rests and remains in the spot to which it is attracted.

QUESTION IV.

[Bodl. —; Ad. L.]

Why does the earth tremble?

As marrow to my bones, and healing to my flesh, as the cool draught of water to the weary soul, so are thy words understood of all, and afford wisdom more precious than pearls.

Now tell me, Why does the earth tremble? You said for two reasons; it is a heavy substance, seeking rest. But, then, why should the heaviest of all things quake?

Uncle: Though my tongue may indite ever so wisely, if the ear doth not understand, I might as well sow among thorns, and put forth my hand to the scoffer. Such is the case when an enquirer seeks knowledge from a teacher, and the words do not reach his heart.

Nephew: Indeed, my ear and heart are one; and your own words shall prove it. Didst thou not speak in my ear, and say, that when crossing a bridge in the land of Cush, thou was taken off thy legs, and thrown down from thy stand, because the bridge tottered, and the earth trembled, the pillars of which shook violently, and the whole terrain round about, so that the inhabitants of that country said: "It is better to live on a drain-pipe"? Therefore tell me, whence the cause that makes the earth, the heaviest of objects, the support of heavy objects, quake? I should have thought it would find rest.

Uncle: Quite true. I crossed the bridge; the bridge trembled, and crashed with me; but rising, I pulled myself together, to tell the cause of the rumbling earthquake. Remember, it was that one portion of the earth, and not the whole that trembled; moreover, the rumbling did not proceed from its own natural constitution, but from the atmosphere surrounding on all sides, which is constant and never rests. At times, the wind is in the clefts and rocks of the earth, entering there and not leaving, until it finds an outlet to return to its kind, which is the air; and when it is unable to do so, for at times hard matter, such as wood and dry earth, oppose it, it makes a strong effort to release itself, and causes the earth to move and tremble.

I, Berachya, have found in the work by the sage Ibn Ezra, and in the work by Parchon, commenting on the words of Holy Writ, "He looketh on the earth, and it trembleth" (Ps. civ. 32), the idea that the winds are enclosed in the midst of the earth as in stores, and from thence they proceed throughout all the world. When the ground is soft, they go forth with ease, as it is said, "And a mist went forth from the earth" (Gen. ii. 6), producing clouds which turn to water; but when the ground is dry, hard, and strong, the wind goes forth with force, and makes

a thundering noise in the earth; 'tis a sign for mortals to quit that spot, and to change their domicile.

Let him rejoice who investeth the truth with a garb white as snow, even for bondmen and bondwomen, those shaven and shorn (of knowledge), sold as they are for ever as slaves to ignorance, listening to knowledge which is not remembered by them, he saying, For such I shall not fail to make of my heart a storehouse holding the treasures of learning and wisdom; so say I, thy nephew, unto you, uncle, "Give unto me that I may eat thereof!"

QUESTION V.

[Bodl. 32; Ad. LI.]

Now, tell me, Why is sea-water salt?

Uncle: By reason of the salt which is in the Great Sea (*i.e.*, the Mediterranean), it being wide and long, and receiving the power of the sun's heat as it rushes on. Being so extensive, it is always exposed to the full power of the sun, and catches its rays; the heat stirs the water as it flows to a certain density, and through this heat and density the waters acquire the taste of salt. If you do not believe it, you need only ask the people who live near the sea, and they will tell you that, without any effort on man's part, salt is found as the residue of the waters on the dry places of the rock which are exposed to the sun and stars; while if you enquire of those removed from such places exposed to the heat of the sun, they will tell you they have not seen any salt, and they can only produce it by the agency of fire and big piles of wood. You can judge for yourself that the heat of fire will produce salt in water. If you do not believe me, enquire, and you will find that sea-water in summer is salt, as water may be in winter in the kettle. Hence it shows that the salt taste depends upon heat.

QUESTION VI.

[Bodl. —; Ad. LII.]

Why does the sea spread over many places, and yet within a certain time return to its original place?

Thy circuit of knowledge will never be broken;

O that it might ever increase and grow more!

Thou art of wisdom the father and token;

Let me draw from the bucket of thy wondrous thoughts' store.

Now, Uncle, I have seen in a book that came from the land of Cush, and was brought before the Wise Men of Tabor, the question asked, Why do the waters of the sea ebb and flow? Here is a copy of that book.

The Wise Men of Arabia agree that the Great Sea (the Mediterranean), in which the waters flow, surround the whole habitable globe, which is formed like a sphere. Everyone knows that the habitable globe is divided into three parts, while Jerusalem is the navel of the earth; beyond lie Egypt, Cush, the Land of the Hittites, etc. Each portion is called a hemisphere, and one hemisphere contains the two parts of the habitable globe. The Great Sea sends out two flooding arms, one head of which overflows from the east, its course being westward, and going the length of the inhabited portion, and the second rushes eastward. These two arms become divided; the sea is reduced, and runs down considerably, until the two arms again meet. In the place where they meet, the waters are raised, so that they stand up in a heap, and they boil in the depths like a kettle; there is a roaring noise of the waves, for each wants to take the course which it began. Consequently, one pushes the other, and is dragged along in the race; and from the force of the impact and momentum which is acquired in the struggle, one beats against the other with great force and noise, so that owing to the might of the crashing, the waters turn backwards. As they come, so they return, and spread hither and thither, and thus it happens that the waters overflow.

Now tell me, Do you agree with this? I am simply repeating what the scientists held unanimously upon the subject. Had I been present, I would have argued with them; and however right they thought themselves, I should have convicted them on two scores. First, that impact of waters would not cause them to recede, but to mingle together gently and without rushing; and secondly, if I were to agree with them that, by reason of the force of the impact and impinging, the clashing of the waters would always grow greater, so that one set would return by the course it came, and the other similarly, then having to my shame to confess their contention, I would say: The greater the clash when the two arms of the sea meet, the weaker the second impact should be than the first, and the third than the second, until, say, the sixth should become a negligible quantity; for who could believe that by virtue of the four or five clashes the Sea would overflow, so as to return through the length of the habitable surface of the globe? Heaven forbid the thought! No. Scientists understand the nature of the meeting of the two arms of the Sea, and that its ebb and flow do not depend on this.

Now I will give you my opinion. When the two arms of the Great Sea, going from east to west, as I explained, and surrounding, as it were with wings, the habitable portion of the earth, grow in strength, the cause why the Sea ebbs and flows is to be found in the formation of the earth's crust, in its inclines and declines. According to men of science, everything has a tendency to spread according to its potentiality, and to be dragged along, but it cannot cross a place which is too high for it. So it is in the case of the sea and its course, when it bursts forth to go along the breadth of the earth, and it does go until it reaches a high place which forms, so to speak, a bar and barrier to its advance, saying to it, "Thus far and no further!" "Here you can put down your proud billows." Thus they return until the sea becomes low, finding in the course of their return the opportunity to descend into the nearest vales, the waters falling with the depths, and turning to their primeval haunts. This is my view. But I should add the theory of men of science, that the ebb and flow of the sea depends upon the power of the Moon, which presides over moisture as the Sun does over heat. And since there are twenty-four hours in Day and Night, during day-time, when the constellations Saturn, Jupiter, Mars, Sun, Venus, Mercury, and Moon have sway three times each, the Moon has at least three periods during which she has power to rule, and during that period she has sway over the waters to deal with them as she likes, both as regards their rising and their influence, to limit them.

This seems to me not at all improbable, as I observe at each New Moon. Some say that ebb and flow depend on the orbit and conjunction of the stars; and what wise men have told, I will not withhold; and thy views not having failed to explain why the sea doth flow and retire, let us feel our way now, and begin to enquire into this theme.

QUESTION VII.

[Bodl. 33; Ad. LIII.]

Why does not the Great Sea, fed as it is by mighty overflowing waters, grow larger? We have learnt that all streams go to the sea, and the sea is not full; and that there is, indeed, no limit to the number that do flow therein.

Uncle: My nephew is wise in his own eyes, and wisdom is girt in his loins; but if he were to spend all the days of his life in the endeavour, he could never prove to demonstration that all the streams do go to the sea, except to adduce the words of "Ecclesiastes." And just as he cannot prove this, so he cannot prove that some do not go to the sea. Hence we should know that just as some flow to the sea, so some streams are produced,

that no sooner produced, they are absorbed. But I am more anxious about the following more remarkable phenomenon: that when the streams go to the sea, returning in their flow, they are carried beneath the earth, and are absorbed by reason of the heat of the sun and stars, some for all time. How does this happen? For, this being the case, would not the sea grow less and become reduced? However, I consoled myself with this explanation: It is the nature of the sea to restore that which comes within its reach; in this sense, too, we can speak of the sea's vitality.

QUESTION VIII.

[Bodl. 34; Ad. LIV.]

Nephew: I set this question to myself, and look to the man of understanding to draw the conclusion. If we say that the streams return from the sea, why do they not taste of salt, finding it in the sea in which they mingle? On the contrary, they flow into it sweet, and return sweet; consequently we cannot believe that they are swallowed up in the sea, and that no trace of them is left.

Uncle: Even the wise may of a sudden be ensnared through want of understanding, and their learning may leave them through obstinacy, when they do not know and will not understand the laws of Nature, the knowledge of which is extended to those who would be wise; but they prefer to walk in the dark, determined as they are by their own gloomy folly. Thou sayest, the thing cannot be, when thou knowest not by observation that which the wise have declared.

I dispute with thee thy foolish contention, that the waters return sweet to their original source. Nor need you be surprised at the matter; considering that when they return from the sea, and are carried through the earth's clay, the earth through which they pass with their weight of salt, sinking as lead, acts as a purifier; not that the soil retains their salt and dense particles, but by it the waters become purified and refined, and return to their former state. Now you will know why they are sweet.

Had you been with Alexander, when he crossed the Great Sea, you would not have been compelled to investigate this point; for Aristotle, his teacher, ordered sand to be brought from land not salt, and he made a big mound on the vessel in which they crossed, and he dug for himself in that sand a well, and whenever he was short of something to drink, and they could not drink of the sea-water on account of their salt, they took of the sea-water and cast of it into the well, and the waters returned to their sweet taste. This is no secret at the present day to the mariners of Africa.

QUESTION IX.

[Bodl. —; Ad. LV.]

Why do streams grow, and not lessen?

The words of the wise as goads they do nerve; therefore through thee will I write aids my memory to serve. Thy words will I write, and so I'll remember thy voice; now meditating therein, my heart shall rejoice. And if at the end, it's the gift of a friend, what matters the wound, if to knowledge you're attuned?

Having entered upon this subject of enquiry, let us now probe it to a finish, and investigate its bearings: Whence comes the influence which causes every stream to be borne along continually, and from one Sea, which even from the day when the world was created, has not diminished in nature?

Uncle: Had you known the beginning of the thing, you would have come to learn its bearings, since a circular object has neither beginning nor end. This applies to the question you are asking, as to whether their circular motion comes from the streams themselves; and if it appears that in their course they roll along as they cover the rotundity of the earth, it is their regular course to move in a circuit, so that their flow is the cause of their ebbing. Now once a Wise Man went on the way, and he met a villager sitting waiting upon the brink of the river; it was in the rainy season, and it was thundering most violently. The Wise Man addressed him and said, "Why dost thou remain in the open, and why not go to the destination you have in mind? You are a fool to sit there." And the villager answered and said: "I had intended to cross this ford, and I am waiting for the waters to pass." The Wise One rejoined: "You are waiting for a thing to pass that goes round and round. You may sit there till the crack of doom." Now, dear nephew, I liken thee to this villager. So far the words of the Wise.

QUESTION X.

[Bodl. —; Ad. LVI.]

Why do not the streams which flow into the sea grow less?

Lo, I have written for thee what is within the knowledge of the wise. Yet further corroboration may be had from Holy Writ, "All the rivers go to the sea" (Eccles. i. 7), since they descend, water like earth moving downwards, the opposite being the case with fire and wind. In proof of my words that the sea is lower than the earth, I might adduce the words of Scripture, "He calleth to the waters of the sea, and it pours them forth"; i.e., He calleth them to ascend unto the high hill, and afterwards

pours them forth. Again, it is written in Psalm cvii. 23, "They that go down to the sea in ships." And we have not exhausted the causes, for the waters of the river being sweet, they are lighter than sea-water, which are salt and heavy; and when they come into the sea, they ascend like light on account of the force of the light of the sun and its satellites, and the other heavenly hosts; and they return to the clouds, are thereafter poured upon the mountains, where they are gathered, becoming in turn the source of the springs and the streams, restored to the place whence they originally came. You find by experience brooks dried up, because there has been no rain upon the earth.

Do not be surprised that *Ecclesiastes* does not mention (explain) about the streams when they return, for he does not explain how the Sun goes beneath; only those versed in the natural sciences do so. These are the words of Ibn Ezra.

I will now return to the statements put forth by the men of science, unknown to men of the time, O Uncle, distinguished as thou art among them and of thoughts full as a pomegranate, for my mind draws in with my heart's eye, as with the pen of a scribe, that which cometh from thy mouth, regarding the waters flowing in a circle, and how they return from the sea. And now with thee my heart quakes day by day "to determine the distinction between waters and waters" to understand their methods; and when I begin to think of the springs, and the founts, and existing sources, I tremble with fear, not knowing what you, my lord, might have to say about them. My heart further trembles when I contemplate level ground and the valley of the south round about the mountains, and land dry for want of water, whilst the mountain high and lofty has springs gushing forth from it; then say I, How does this come about? Or is it that in reality there is no water at the base of the mount, and that even if there were, it cannot get up there?

The *Uncle* replied: Get my idea into thy heart to understand that the source is from the land of the plain, and that the water comes to the hills from the slopes, so that "it shall be health to thy navel," and speaking to the earth, it will teach thee. For in the bosom of the earth's plain are the sources of water distributed in such wise that by means of various channels they are carried hither and thither as waters flowing lengthwise, yet spread across the earth in breadth, it sometimes happening by chance that they light upon caverns of the earth, surrounded by stones and hard substance covering and resting upon soft earth from above. The waters can consequently not spread along on account of the hard and rocky matter; the result being that they are lifted on high and rise upwards, for the ground above is soft, till one gets to the top of the hill, and on to the course which

is now, as was wont before, worked by man's practical ingenuity and design. You will understand this, knowing that man is able to raise (water) to the top of a hill from a depth of one or half a mile.

This is the reply of the Uncle to his Nephew. The view of Ibn Ezra I have already given above.

I will now begin the dialogue, in the form of question and answer, between Nephew and Uncle.

I, Berachya, son of Natronai, was worried in thought till I girded my loins, and translated these subjects into Hebrew. I found them in non-Jewish writings, translated as they were from the Arabs. In them were concealed matters coming from the wise men of our age, and this splendid knowledge of the expert was not even looked at by the eye of the untutored. Now when I saw such splendid wisdom placed in front of (restored to) you in an ugly setting (*or*, "such a splendid wisdom, with nothing objectionable in it restored to you), I cleansed it from the hand of the Gentile, and wrote it out in the Holy Language, which is so dignified in tone.

Now this work is a dialogue between two contemporary scientists, an uncle and a nephew, a contest to probe and to test matters, in the spirit of the Scriptural clause, in which one man thrusts at the other.

The intelligent will understand the application.

QUESTION XI.

[Bodl. l. 1; Ad. I.]

Why do plants sprout forth when they have not been sown?

O Uncle dear, my light and honour! I well know that thy thoughts scatter far and wide all wisdom and counsel, to instruct me concerning plants and herbs, whilst others see but vain and misleading teachings. For I have enquired of many, Why do herbs spring up when they have not been sown; but whither does their reply lead? They destroy the path of thy ways. But thou, my lord, shalt be listened to in what thou utterest.

Uncle: If thou, my nephew, hast asked a difficult question, thy intentions are nevertheless straight and well-directed towards me; there is sense in them and evidence of attention; therefore keep to thy point, and neglect not to tear off the film of folly from thy heart, so that thou mayest laugh at the fact that for a time thou hast been kept back. By the help of both of us thy

query shall be made clear as truth, and on thy account shall God be blessed and exalted, He who doeth wondrous things, who hath decreed, and such things happen. Thus it was His will that pronounced the *fiat*, and the chaff of herbs sprung forth without the help of man, some for good, some for ill; man could add to the work of Creation, he could not lessen it. Furthermore, it should be observed, that in the nature of plants there are four things innate, called the four elements, as in man's own body, viz., cold and heat, dryness and moisture, corresponding to fire, water, dust, and wind. Some call these the four roots (bases). It is well known to men of science that in plants the four elements are found as phenomena, even though they are not patent to the eye. And so with regard to the earth upon which we live, from which plants spring; it is compounded and constituted from the four elements aforementioned, even though to the eye of man it appears as if it consisted of but one of the elements, viz., dust. This was understood and proved by the early philosophers. And so in the case of fire, water, and air, each is named according to that which appears to exist in it in a more preponderating degree than the others. Thus, to repeat, we call the substance "earth," because the "dust" element is to be found therein to a greater degree than the three remaining elements; and the same applies to "water," "fire," and "air." And if you fathom the subject to its depths, you will find that "dust" has its physical properties alone, and "fire" has its own, and so has "water." And thus I would reply concerning this matter, that in the very bosom of the earth which we inhabit, there is dust of a distinctive nature without the admixture of the other three parts, at the point which is called "the limit's end," being of a different constitution, and indivisible into parts; the same applies to water in the midst of the waters, there is a portion which is simply water; the same applies to the atmosphere, there is some portion of it which is simply pure air, without the admixture of the other elements; and the same may be said of fire; they are distinguished according to their sources.

The end of the whole matter is this; that in the ground which produces grass and herb are the four elements mentioned above; and we should understand, that while the grass is yet tender in the earth, it is brought forth and made to blossom by the four elements; the ground of dust gives it root, its clods and adhesions being, as it were, the earth's bosom; the heat makes it fresh with moisture, which becomes scattered hither and thither in the lap of the earth and in the mould of clay.

Now the nature of fire and air is to rise upwards, and each of these completes the bringing forth of the grass according to its nature, fire endowing it with heat and dryness, and air with

cold and moisture. By help of these two, it grows and appears above the earth; in fact, it could not exist without the help of the natural qualities of dust, which after all is its mainstay and support in the process of growth. Thus and in this way does it happen that grass springs forth without being sown.

But, Uncle, in what way did you help when, open-eyed as you are, you had not the power to bring to light thy words upon a matter of public contention, people maintaining that plants derive their chief nourishment from dust, and more so than from fire?

Yet if this be the case, I would ask, why is this plant warm by nature and that one cold, since, according to your views, by far the larger portion of the plant springs from dust, which is cold and dry, and therefore we should call it, as you told me, cold rather than warm; there being the four elements in the earth, and it is called "earthy" in consequence of the dust, which predominates in it above the elements air, fire, and water.

QUESTION XII.—XIII.

[Bodl. 2, etc.; Ad. II.—V.]

Why are plants called "warm"? Secondly, Why is a growth springing forth from earth more than from fire called "herb"?

UNCLE.

In truth, my words shall fall upon thy ears by way of explanation, for this subject is not obscure, viz., that herbs are derived more from dust than from fire, since their place of growth is in the dust; and, therefore, thou dost ask of me, since they are cold by origin, coming from dust, how is it that thou seest in them natural heat, which implies more fire? Now to reply to this point also. Every object possesses two characteristics, one called greatness (quantity) and the other power (quality): and if a body is treated on the side of its growth, it may also be regarded from the side of the other attribute, power. This you will understand better from the following simile. Look! my tunic is green, and in my ring there is a green stone. The green in my tunic is as the green in my ring, yet the nature of the green in the stone and its power is greater and stronger than the green in the garment, for the green in the stone comes to it by nature, whilst the green in the tunic is in comparison less in strength, inasmuch as it is artificial, forced by human means to be changed from its original condition. Now if you were to stoop and see the tunic in its entirety, i.e., in its whole quantity, it will seem to you that the garment has more green than the

stone, since in size it is larger than the stone; whilst, according to origin and quality, the green in the stone exceeds that in the garment. So with the green herb. Judged by the standard of quantity, i.e., according to its place of growth, you would call it cold; judged by the standard of its original source, warmed as it is by fire, you would say it was warm; for it is not, as you think, that you can discern the fire element in the dust itself; but plants spring primarily from the dust, since the element of fire is but slender.

If this appears trivial to you, it can be strengthened by the consideration of the four elements, and you will, by probing and investigating, and searching the dust to test its quality, come to see why it is called warm.

Nephew: Do you mean that in this way plants may be clearly defined? Then I ask: How comes it that plants, since they spring from one and the same dust, viz., the ground (which the Hagarites, Ishmaelites, or Arabians call "nurse," the Hebrews call "mother of all living," the Cuthæans call "mother of bodies") may be divided off into cold and warm, dry and wet? For it is known to all that everything grows and flourishes by the help of that which is of its own class and kind, while it is destroyed and spoilt by that which is of a different kind and nature; and how then can plants come to be so different one from the other, to be either cold or warm, dry or wet, having sprung from one and the same spot, a spot which you confess to be of a single kind? This is absolutely impossible.

Uncle: I will now try and see whether you have understanding, as I will answer you in brief regarding the methods of plants; they do not gain growth from the body of the fruit.

Nephew: All this is of no use to me, since I see with reference to that which is torn out of the earth, that it is green and fresh in face of the sun, while it is yet in the earth; now it comes forth as a flower, and I cannot call the ground "the mother" of the herb, that strengthens it by its freshness and moisture, since as soon as it comes forth from that which is called its mother (or, "having had its day"), its root becomes old, and its stock dies.

Uncle: I do not agree that the herb comes from the ground consisting of one alone of the elements afore-mentioned, but that it comes from the ground compounded of the four elements, each, as I told you, of varying qualities as regards cold and heat, dryness and moisture. Can you not see why the herbs were not created in air? In air they would die, the sun killing every flower, every root, every herb that would be above the dust; whilst all that is in the lap of the earth may be likened to a newborn child taking hold of its mother's breasts, and, being nur-

tured by them, will not easily wane. I have now told thee sufficient to be of instruction to one who is fond of knowledge, and who, penetrated with this knowledge, will be heartened.

Nephew: Since thou hast introduced me into the subject, thou must instruct me to the end, for the questions are bound up with difficulties, whilst I walk along the crooked paths, straying from the way of understanding, and to thee my complainings are directed.

Uncle: Heaven forbid that I be guilty of wickedness by your obtaining erroneous ideas through my researches; for all created things come through the *fiat* of Him who decrees and commands, and whose actions are in righteousness—a matter which they understood who grasped the meaning of the motion of the constellations, that their change coincided with a change in the boughs and blossoms, for they depend upon the sun and moon for heat and cold. In my reply you had the utterance of all experts; and so you know what you knew not, thus verifying the statement, "Seek, and ye shall find."

Nephew: If thou wilt put thy spirit in me, I shall not hold my peace nor remain passive and idle. Tell me, if thou knowest all, as thou hast said (*or*, "according to the truth"), whether the plants are created from the earth in which are the four elements; and if it be according to thy statement, why do they not spring forth in the air or in water, or in fire, the other of the four elements?

Uncle: Nephew, is not this the thing which I have said, that all things like plants shoot forth and grow in their natural element, and grow more naturally in the dust than in the other bases of life?

Nephew: Ah, but I have seen flowers blooming in water. What then becomes of the theory of the four elements?

Uncle: It has been decreed of old that each thing should turn in its way to the source from whence it came; dust to dust, fire to fire, water to water, and wind to wind.

Nephew: Then answer me this further point. We have observed that dust, that is the ground, bears and brings forth according to its natural kind, *viz.*, herbs. Now enlighten me concerning the other of the four elements, fire, water, and air; do they bear and bring forth?

Uncle: You will find that the waters do bring forth abundantly living creatures, *viz.*, the fish; that the air (which is called a substance) doth generate clouds, and it brings forth a creation called *Lilith*, which inhabits ruins; and fire gives birth to a bird called *Salamander*. Scientists have come to this conclusion, after having investigated the subject.

Nephew: To thee, beloved Uncle, I am indeed indebted for

having gained this information concerning plants, the cause of their heat, why they spring from the earth, how they come to live, and how it comes about that they rise from the earth more than from the other of the four elements, and why they die.

QUESTION XIV.

[Bodl. 3; Ad. VI.]

Why does the tree which is grafted on to another produce fruit like the graft and not like the stock, which has its nourishment from the earth?

Now instruct me concerning the growth of trees, for in this matter the fount of my intelligence is closed. Why, I ask, does the engrafted tree produce fruit like the graft, and not according to the species of the stock which grows from the earth, and spreads lengthwise and breadthwise? How can it be so treacherous to its former species as to give over its strength to the junior, to bear fruit according to the latter kind?

Uncle: O my nephew! Having once ascended the heights of intelligence, who could wish to hide aught from thee? Nay, I will give wisdom to him who would be wise. Understand, you have learnt that the tree which is the graft that is cut off, inasmuch as the saplings are only lopped off from the top, only grows and thrives by virtue of the strength and sap of the graft which is engrafted upon it; and thus it will grow by means of the latter's freshness and moisture; the root which draws the moisture from the ground will hold back what it requires, and leave to the graft the residue; like that which determines the life-stem of all living beings retains what it needs, and permits the remaining members (of the body) to have what it does not require for itself. But the shoot also increases in growth and flourishes, bringing forth blossoms and buds, producing fruit and branch; and since the fruit is nearer to the shoot, and further removed from the stock, it is in closer relation to the nature and kind of that which is nearer, and further from the species of the root which is more distant.

QUESTION XV.

[Bodl. 4; Ad. VII.]

Why do some animals chew the cud?

O Uncle! Having sustained thy reputation for keenness and intelligence, "there is no one so wise and understanding as thou art"; so I said to myself, I would like to know something more about the constitution of animals, but the subject is far from me. Do thou, therefore, instruct me regarding those animals that chew the cud, and those that do not.

Uncle: Dear nephew, let not thy thoughts distress thee. Having your eyes opened on this subject, understand that among men and beasts there are varying constitutions, some being of a colder, others of a warmer nature; some of a dry nature, others of a moist; know, too, that the heat of the inward parts grinds the food until it becomes fine; it cooks it and changes its colour, turning to heat the cold found in colder animals, which, in consequence of their coldness, are unable to grind their food, but which, owing to their lack of heat, cast it from their stomach into their mouth, and it does not return until they have first ground it finer than before. This is the way of oxen, goats, and lambs; and these chewing the cud have, therefore, been called "cold," the *Goyim* calling them "melancholic." You may distinguish these by noticing that their fat is hard and clinging to the flesh, in consequence of the coldness of their stomach, which is not the case with animals that do not chew the cud.

Nephew: I know that horses and asses are warmer than those beasts called "cold"; but what have you to say regarding the ewe-lamb, which is on a plane differing from that of the ass and the horse? Why does it chew the cud more than they do?

Uncle: Because the teeth which they have on both sides help to crush their food and cut it fine, the ewe-lamb being unable, not having an excess of heat, to chew the cud by reason of its teeth alone.

Nephew: I will debate this point with thee, but in all kindness. And if thou art able to answer me, take thy stand and oppose me, but thrust me not off in my search. Thou hast said in my ears that all that are cold and dry chew the cud; why then does not man, who is of this species and nature, chew the cud—man, whom the medical profession calls melancholic among animals?

Uncle: Although man belongs to this category, dost thou not know that he is said to be warmer than those animals that chew the cud? You can test this for yourself, since oftentimes man that is cold, whose stomach is very cold, will not digest his food, but it will come into his mouth, or, having intelligence, it will become loathing to him, and he will vomit what he has swallowed and cast it forth.

QUESTION XVI.

[Bodl. 5; Ad. VIII.—IX.]

Why do those animals that chew the cud, when lying down, crouch on their hinder-parts and on their hind legs?

O my nephew! Though thy question has come upon me like a weapon, I shall not shake my lap (as a coward), but I will parry the stroke. Dost thou not know that all animals that are wrapped in fat on their side and downwards, tend to get fatter; you see it in the case of the ox, whose fat sticks close, and it is, therefore, cold, the liver weighing it down to one side; and in consequence of its weight, the animal lies on the side of the liver, viz.—the hind part.

O Uncle! Is not thy reply at hand, and how canst thou answer thy nephew such a fable? If they lie on this account on their hinder-parts, they ought to rise on their fore-part, which according to thy statement is the lighter; "as they lie, so should they rise."

Uncle: Your question, O nephew, you hurl at the heart of the simple, even as with a hammer that splinters the rock, and man becomes ensnared and swallows crooked words. The question you ask is hard, but I can extricate you from the difficulty; only pay attention to my words. As for all animals which, having fat of the class of those that chew the cud, when standing up, the cold fat and liver weigh them down, and of a surety they are stronger on that side, because they have an excess of fat about the loins; and if on account of fatigue they lie down more on the hind-quarters, heavy on account of fat therein contained, which rests by reason of heavy toil, they become stronger in that very part, since through having rested, they become warmer after the cold which weighed them down. At one time they are overweighted on the right, and another on the left side. But when they become warmer, it is easier for them to rise on one side, for being heated, it is the stronger.

QUESTION XVII.

[Bodl. 6; Ad. X.—XI.]

Why does not the bird urinate?

Uncle! Oh that the words flowing from thy lips might kiss my forehead, they uttering in reply expressions most direct. Every wise-hearted one longs for thy words, and is lifted up by thy speech. So also do I lift up my head, and my soul thirsts to know why the bird has a special mode of its own, inasmuch as all other animals urinate, whereas the winged fowl never does.

Uncle: I will answer you according to nature. Understand, that all animals are reared on milk, and the milk comes from the juice of plants and the sap that is in them. The food produces a duct in such animals for the urine to pass, and with the water which flows to the ground the sap finds a way through the urinal

cavity. Now after the sap has been in the habit of passing through its duct, the latter is no longer stopped up. Birds, on the other hand, are not from the start brought up on something moist, only on small stones or produce; they have therefore no sap coming from their food; and when the stone comes into their crop, it closes up the urinal cavity, and of that which they drink and of the gastric juice nothing gets further than their feathers, which retain the moisture. Pluck one of their feathers, and you will find moisture in it.

Nephew: But enlighten me then, Why have birds no stomach as other animals?

Uncle: Now you are asking a good question. Know that birds are reared on hard food, such as gravel and wheat, etc. A stomach would be unable to grind their food fine enough, for it is only strong enough for soft food; whereas the crop has strength and hardness, which a stomach has not, harder than flint, and like that of a diamond. The crop is intended to crush fine every hard substance, since all its sides are full of sinews from without and from within, and the muscle between the inner and outer sinews is particularly warm. It therefore grinds to perfection all that comes within it.

QUESTION XVIII.

[Bodl. 7; Ad. XII.]

Why do some animals see in the night, and others not?

O Uncle! Mine ears have listened and understood, nor did I regard it as futile what thou hast delivered concerning the stomach. Do thou then teach me something as regards the sight of animals, as some see, and others do not see in the night.

Uncle: Dost thou not know, hast thou not heard, that there are seven films in the eye, and that there are three kinds of moisture in them, from which proceed the principle of sight? First, the innermost of the three is called the white of the eye, being unusually so, and disperses the sight and brings it out. This is all sight. Secondly, there is the middle part, not as white as the former, nor as dark as the third, which concentrates the rays, and prevents them from being scattered more than is proper, and which, so to speak, holds them in check.

The third is the outer portion, which is darker than the second; and the dark part in it is to collect and concentrate the seeing-power of the second, so as not to permit it to scatter itself according to its will and pleasure; it is also placed in charge of the second, and upon it depends primarily the organ of sight. For this is patent and well known to all men of science, that if

the vision were scattered in consequence of the whiteness of the two preceding parts, the eye could not see and make out any small and fine object. And now, since seeing is concentrated by means of this third portion, which in reality is the key to sight, it follows that the bird and the animals that have white in the eye to a greater degree than black, found in the two parts that collect the light, will be able to see in the night, since the white in the eye prevails in the darkness and the gloom more than by day. You may see this in the case of the cat that sees best by night, and cannot stand the clearness of daylight, as it is too strong and rare for it. Your eyes, for example, cannot stand the sight of the sun, but in the night when the sun's light is no hindrance to it, you can see better. I have tested this with many people whose white of eye is more than the dark; when they come across snow, they cannot see at all, or but very little. And you can prove this yourself; when you wish to have a good look at a thing, you strain your sight and press your eyes together, that the rays of sight shall not be dispersed; for when this latter thing happens, you do not look at one object, but you look here and there.

He who would understand will listen; while he who refrains will stand aloof. It is wisdom that gives the character of greatness to the wise.

QUESTION XIX.

[Bodl. —; Ad. XIII.—XIV.]

Have animals a soul or intelligence?

I called thee to mind upon my couch, for from thee have I derived much kindness, and there slumber in my heart some of the things which have been planted by thy wisdom; let therefore now thy reflections be scattered abroad, so as to refresh the memory of them. Make known unto me whether animals have a soul, and whether they possess the power of reasoning or not, for this no man knows exactly.

Uncle: Thou hast justified my answering thee, for the matter which is not on thy tongue thou sayest thou canst not be enlightened upon, as no man understands the subject. Hast thou not heard that what is doubted by the simple-minded is not concealed from the wise?

In very truth, animals have a soul; for it is manifest that animals have knowledge, and in that knowledge there is either judgment to discriminate that one thing is different from another, or the power does not exist. It is the same with a man who is looking at one coming towards him; he sees him, but he does not

pay sufficient attention to know clearly whether he is fair or dark, or whether he be of a pale or ruddy countenance. I mean this. A thing may be looked at and known by the eye, but not known to the mind, so that if the man were asked, "Who is it that is coming towards thee?" he would not know, since he has but a confused notion of him.

And the *Nephew* said: Thou hast spoken right, for knowledge need not imply judgment to discriminate between one thing and another, nor need there necessarily be reasoning or intelligence in the matter of touch, beyond the knowledge that something is at the moment being handled.

Whereupon the *Uncle* rejoined: You are caught in my net; saying, that if they have the judgment to reason, they have not the knowledge to seek flight on account of some object, just as you may look at a thing, and not have the power to sufficiently distinguish what it is, and so you would not try to escape from it, as might occur to you and to others besides you.

Now if animals had not this knowledge and judgment to distinguish and know what they see, how will you account for the following fact: You see a hound running furiously in a thunderstorm, and carried along the ground in excitement, and in the height of his running, he will come back. What is there to account for this? I, therefore, say that it does possess judgment to seek flight, and this faculty cannot come from the body alone; it surely comes from the soul. Again, you may learn it from the voice that is heard. He who listens applies reason in the act; for if he did not reason when hearing the sound, he would do nothing in consequence. You see it in the case of dumb animals; when you speak to them, they attend with intelligence. For if it were not so, they would do nothing on your behalf (when you order them). This is the truth, otherwise you would find no animal come at your bidding.

Now you will see clearly that the hound, when afraid, and hearing his master's voice, will begin to do that which he had not done, or will finish that which he had begun, since he has knowledge arising from his bodily endowment, having its basis in the material, while he possesses the judgment to discriminate, which is resident in the soul. And the animal has undoubtedly the power to distinguish. Dost thou not see that the hound tracks the footprints of the hart and runs after it, so that its master shall be pleased with it and rejoice at its feat? Seeing this, must we not attribute it to the power of judgment and discrimination—a faculty resident in the soul? O my nephew, God forbid that thou shouldst not believe this, and only think, as the world believes, that animals have that knowledge without judgment to discriminate!

Nephew: O my very dear uncle! Art thou not ashamed and confounded that thy words contradict one another? You have just stated that animals have knowledge, and in saying this, you confess that they have a soul. Now, is it not a fact that when you smell a thing, you have something apart from that which you smelt before? And this occurs with everything that has the "breath of life in its nostrils"; but it is not so in the case of an object that is immovable, as, for example, a stone. It is only so in the case of things that have movement, as an animal; and since such "breath" cannot be thought of without a "soul," you say that the animal has a soul. Furthermore, moveable beings have faculties which are divisible, some belonging to the body, others to the soul; bodily faculties tending upwards, being of the nature of fire, some gravitating downwards, of the nature of dust; other faculties, having their seat right and left of the body, front and back, being of the nature of air and water, and the organ of speech being located hindermost (or, traced to others), derived from the soul. And these faculties are found in dumb animals that move about, and therefore I must say, that animals have souls. The end of the matter is, that we can by no means establish to a verity that they have reasoning power determined by Creation as residing in the body and not in the soul.

As a fact, the higher faculties are in the soul of man, so that it might rise up to Heaven, unto Him that gave it; but it is different in the case of the soul of the brute, which is but wind that ascends into air for but a short time, from which it disperses hither and thither, and vanishes as smoke in a moment, descending downwards.

Now I, Berachya, can arrive at this conclusion by way of Scripture, for the word "soul" is never applied but to man alone, the most convincing proof being found in the verse: "He giveth soul unto the people upon it, and spirit to those who walk therein" (Isaiah xlii. 5). We could not base this plea on the phrase alone which runs: "All that hath the breath of life in its nostrils" (Gen. vii. 22), although it occurs immediately after the reference to man. Furthermore, it is said, speaking of Creation: "He breathed in his nostrils the breath (of the spirit) of life" (ibid. ii. 7), which is the soul, located in the marrow of the forehead, as mentioned in this work.

Now in the creation of animals it is said: "Let the earth bring forth the living soul (*nephesh*) after its kind" (ibid. i. 24), the *nephesh* being in the liver; the word itself of the root as occurs in the expression, *uphishtem*, "And ye shall go forth and multiply" (Malachi iii. 30), being of the meaning "to increase and spring forth," for this reason, that the blood is the soul

(*nephesh*). Now do not be surprised to find the *neshama* (breath) called both *ruach*, "spirit," and *nephesh*, "soul," and even the body called *nephesh*, as in the phrase, "He will redeem my *nephesh* from the grasp of the grave" (Ps. xvii. 16).

This is also the explanation given by Ibn Ezra, namely, that the *nephesh* is the "growing power" resident in the liver, in which all living things share. This *nephesh* is of the body, the faculty that longs for food and cohabitation; whereas the *neshama* is of the higher kind, its seat being in the forehead, ever seeking to teach man the ways and works of God Almighty—the *nephesh*, seated in the liver, being always in search of bodily pleasures. Need I dilate any further upon this subject, seeing that I have explained it at the end?

QUESTION XX.

[Bodl. 10; Ad. XV.]

Why have animals instruments of defence, which man has not?

To me the matter appeared remarkably strange, and it surprised me, when I found, that the animal had an advantage over man, inasmuch as animals have attached to their bodies instruments of defence, while men have not.

Now, Uncle, I cannot boast of a brain capable of unravelling this point by any innate knowledge of mine; but according to what the eye and ear of men perceive, everything has been created in accordance with the rule of equity and right. We know, indeed, that the ox has horns, the boar tusks, and the lion talons; some animals have special means for fleeing, so as to enable them, being light, to run from their pursuers; we see them in the feet of rams, conies, and hares. But man has been endowed at Creation with an advantage yet greater than this in the gain he possesses, by reason of his inventive genius, to forge instruments and weapons.

O Nephew, listen and hear, and I will teach you wisdom. Man is called in Arabic the animal of the level, and in Greek the animal of the rule. And they are right; for sense is implanted in their hearts according to "the measure," "rule," and "level" by which men measure in the world, so that he might be tranquil, and restful, and quiet, when he experiences times of peace; but that when, in the whirligig of time, war supervenes, and his heart becomes violent, and he boils with rage, he might go about and seek to prepare instruments of war, to carry spear, stones, and terror, shield and javelin, and thus equipped to enter

into battle. But when the world is quiet, he will understand how to release himself from all this incubus; he will rest after the storm, and be restored to his equilibrium.

Now if such instruments had been fixed to his frame, he would get sick of life, and despair at the sight, having no use for them, all being peaceful round about him. Again, suppose a man were angry with him, or he with another, they would have the common sense to take council together, and by means of argument to come to a compromise and understanding with each other. But as for the brute, who has no power of speech or argument, it is necessary that it have such weapons for defence, so that one might be provided against the other. So far as regards instruments of warfare. Now, if man had facilities in the way of special adjuncts for purposes of flight, so that his feet might be nimble as those of a hind, he might be turned aside from his ordinary course of life, and come to long after and pant for the wind, becoming a man of the wilds, his legs, hands, and limbs being subservient to his eager haste; so that if the despoiler came suddenly upon him, he would have no time to rise and stand up against him, and to rouse himself against his oppressors, and to carry the accoutrement of war on account of his frail nature.

It is for this reason that the Creator formed man of an equable disposition, so that in peace he might be quiet, and in time of war resolute and vigorous.

[Bodl. —; Ad. XVI.]

[Why have men and beasts sinews?

O Uncle, I have probed the fountain of thy thoughts, and I am yet not satisfied. Therefore, tell me now, why men and beasts have sinews, and how it came about that they were created before the flesh.

Uncle: Understand, Nephew, that the sinews in man give strength and firmness to all the limbs, being formed in network fashion. Our wisecracks of old knew what they were about when they bound the bodies of man and beast with cords, and placed them in the overflowing stream and in the place over which the torrent of boiling waters passed; and when, after a certain fixed period, they found the flesh gone, and the bones of the body which had been bound fallen to pieces, whilst the sinews remained in their frame of net-work. In this manner they came to know and solved the question about the finer cords, how they were distributed here and there throughout the body

from the brain; and they taught the blood-letters concerning the healing of the body—to bring down as much blood as was necessary; and further, how the sinews bound the limbs together, and strengthened them by means of small ligaments, “a coating of skin for the clothing of man.”]

QUESTION XXI.

[Bodl. II; Ad. XVII.]

Why does the clever one at times forget, and the fool remember?

If hidden things have caught me in a trap, the sick at heart and bereft will rejoice; for, Uncle, my heart beats within me when I call thee to mind, adding to my thirst which is intolerable. Hidden from me is the explanation why many a wise one is forgetful, while he who is not clever has a memory for things.

Uncle: Since thou hast mounted the steps of knowledge, thou hast trampled under foot many an error. We know that the power of the soul permeates the whole body, and that there are parts in man's body that receive the nerves radiating from the brain that are more responsive to sensations than others, as, for example, the eyes and ears, for the bones and the liver are not sensitive. The heart thus receives more of the influence of the soul than the members of the human frame, and it is on this account that all these members are subject to it; and whatever the working of the soul in the body, it depends upon the support which the body lends to the soul. The first help is from the brain, the second from the heart, and the third from the other organs. From the brain proceed shrewdness, judgment, discrimination, and recollection.

At first, man learns to understand; after this, he comes to form a judgment, so as to distinguish what he has learnt; and then he is able to recollect for years that upon which he has formed his judgment. In the cavities of the brain, on the forehead, there are collected the five senses, and from thence they are distributed, so as to make manifest their impressions. I will explain this with all clearness. The knowledge gained from shrewdness, judgment, and recollection does not proceed from one single cause, but from varied causes. Shrewdness comes from moisture, and memory from dryness; for nothing receives a deeper impress, form, and likeness than dry matter; and the dry matter only receives this impress and likeness easily from the time that it has once received such impress, form, and like-

ness, when the bond between them is not quickly broken and removed. Therefore, he who has a brain will have a good memory, but not necessarily knowledge.

Nephew: O Uncle! Don't be angry if I worry you to explain this subject to me in the clearest way possible, so that I come to the very depth of it. I have heard people say that the government of an image or impression in man is threefold in character: judgment, discrimination, and memory, as thou hast said, and that these faculties all reside in the brain. Now if men of science knew this, alas, the deluded ones! For I have heard amongst the wise men of Arabia and amongst those of Kedar their explanation, as follows: That the form of a thing is really seen in the middle (of the eye), *i.e.*, the image of a man or woman is seen; the eye sees the form; and the judgment to distinguish it resides in the middle of the brain; meaning, that in seeing the form, the brain determines it clearly by the organ of sight, distinguishing what it is, so as to recognise it from the back. Memory, too, is located in the hindermost part of the head, in the ultimate cavity of the brain, the place in which all the other impressions are collected; hence man remembers that which he has seen and determined.

QUESTION XXII.

[Bodl. II; Ad. XVIII.]

What is recognition of form? What is memory? What is judgment?

My request to you now is, How does all this become known to man, born of woman, for how can the working of the soul be known?

Uncle: O Nephew, by the man devoid of understanding this is considered impossible, since knowledge is spurned by the fool; but I beg of you to realise that it is no secret to him who first revealed the secret, and you may understand how he came to gain the knowledge. He applied himself to understand why the brain has cavities. He observed a man, otherwise at ease and serene, who had been wounded by a stone on the forehead just in the spot wherein the fount of impressions centres, and from that day onward that man failed to recognise the image. But there remained in him yet the other two faculties. He next met with a man who had been injured in the middle of the brain, and he again was unable to distinguish one object from another. A third person was affected on the side of memory. The fact is, there is but a fine line between these several parts of the brain.

We, therefore, know that the soul is not matter, but that the phenomena of the soul are manifest in material substances.

QUESTION XXIII.

[Bodl. 12; Ad. XIX.]

Why is the nose placed over the mouth?

The tongue of the wise brings healing; and therefore, O lord, tell me why the nose is placed over the mouth, for it is nauseous that the mucus of man should come down into his mouth.

Uncle: I am not wise enough to answer such questions; but understand that nose and mouth are not such important organs as the brain, heart, and liver; they serve, first, to draw down the mucus from the head; and secondly, they have the power to induce the mucus of the head from the right and left side. And since the mouth is one of the organs of the body, and as from the stomach upwards there could be no aperture in all the body other than the mouth, the mouth was placed near to the stomach, so that it might empty the moisture coming from the stomach, and spew it out.

QUESTION XXIV.

[Bodl. 13; Ad. XX.]

Why does the head lose its hair from the sides of the face?

This is the question, Uncle, which I ask of you: it is a big question, and I seek an explanation.

Should not the Creator who made man, and adorned him like the cherub with spreading wings, and left nothing wanting to render him a thing of beauty, have perfected his beauty so as to include his face? And now just because everything is so perfect in him, he is often derided and laughed at on account of his baldness. And if it was natural that he should become bald, then why not have the baldness at the back of the head?

Uncle: If you are clever, you would infer one thing from another; from what I told you before, you can know this very thing. It is through the mouth alone that everything enters the body. In the stomach the food is ground and cooked, as a pot boils upon a fire; and in the passage through which the food passes, its smoke rises upwards; and this passage is nearer the side of a man's face, and somewhat further away from the back of the head. It is because of the steam rising from the stomach that the pores widen and spread, for the head faces the steam, such is its course; and it is on account of the heat of the stomach boiling like a kettle, that the pores of the head, spreading and widening, send forth the moisture, and the limitation of the pores cannot withstand the strain thereof. It is through this

that it happens that young people, being hot-blooded, are specially prone to become bald, for the hair can find no support by virtue of the pores.

QUESTION XXV.

[Bodl. 14; Ad. XXI.]

Why is a sound heard by several people?

How long shall seductive paths, increasing their snares, afflict my soul? For if, as they sayest, the subjects about which I enquire are not hidden from me, at all events doubt is engendered in my heart, which over-rules all my thoughts. Therefore, O my sire, extricate me from this net. True scientists tell that every sound that issues forth, that exists, and that is heard, is a matter of atmosphere; and it is known that the air is a material body, and that one body cannot be in different places at one and the same time; and this being so, how can one sound affect the ears of various persons?

Uncle: O Nephew, thou hast drawn this from the source, but alas for the day when, expecting to find your response, you did not sink your bucket; nevertheless, may you find the fruit of your labours at my hands!

Know that the air which exists in the mouth of man, and is expelled outwards by the tongue and by the throat, thrusts from before it that air which was expelled in front of it; and that which is present at any given moment pushes the second, and the second the third, and so on in progression, until the air-waves are recognised by the ears of many folk; these whiffs of air are similar one to the other, but they are not renewed ones. You can compare it, if you would understand the point intelligibly, to a stone when cast into the water; it makes a circle, when you throw it, and from that circle a second, third, and fourth circle is produced.

QUESTION XXVI.

[Bodl. 15; Ad. XXII.]

Why can you hear sounds through a wall, and yet not see through a wall?

Nephew: According to your explanation, why then does not a wall of iron, or copper, or stone interrupt a sound; why does it allow it to pass through on the other side of the wall, and be heard? How is it that the air has that force to pass, seeing there is no opening? Furthermore, why in the same manner

can you not see through a wall, for the power of the eye is greater than that of the ear?

Uncle: Hast thou not heard, and dost thou not know, that all bodies are porous? If thou canst not test it by observation, it can be known by this, that sweat passes through stone or metal, and you can be sure of it by the sweat generally, and by the hair, which exudes warm moisture. As regards sound, which is really air, it passes through the pores which are invisible, and is heard by the hearer. With reference to your query as to why the eye has not the power to see through such pores as the ear has the power to hear, dost thou not know that the eye is full of darkness and veiled in gloom, so that it has the power to see only as far as the wall, in so far as the light shines upon it either in reality or by reflection, and does not penetrate (lit. cover) the wall, the light knowing its limitation, "Thus far shalt thou come, and no further"; it has no power within the wall.

QUESTION XXVII.

[Bodl. 16; Ad. XXIII.]

Why does the eye see at all?

Nephew: Since thou knowest all this, having gained it by diligent toil, and thou hast none nearer to thee than myself to profit, do thou invest me with but one portion of thy knowledge, and instruct me on the point: What is the nature of eye-sight, and why does the eye see?

Uncle: Ask of me, and I will give thee thine inheritance, and will answer thy question whilst breath be yet within me. Understand that light is, as it were, a rapid and rare form of atmosphere of the nature of fire, and is known to have been created from that kind that goes to make up the two nerves that run from the brain to the eye-cavities, called delicate organisms, and their endings are not found in all the forehead and round about, which is all hard, with the exception of these two very delicate cavities; and it is from them that sight proceeds. Even sight is material, since the air proceeding from the brain is said to be matter, compounded indeed of the four elements, but the element of fire preponderates to a very great extent.

QUESTION XXVIII.

[Bodl. —; Ad. XXIV.]

Is breath real or imaginary?

Let me know concerning the breath of man which comes from his mouth, is it real or imaginary?

Uncle: It is easily understood that it is a reality, since it is made up of the four elements that govern the bodily form.

QUESTION XXIX.

[Bodl. —; Ad. XXV.—XXVI.]

Why has the eye the power to see, etc.?

O *Uncle*, while deep sleep settles upon other men, my thoughts trouble me, wishing to know why the eye has the power to see the stars so quickly, and to draw its view from thence without interruption to a greater degree than the mind (has the power to grasp); for with his eyes, man sees them altogether, whilst the mind cannot grasp their number. The eye is thus quicker than the mind.

Uncle: Know that the brain, seat of the soul, according to the majority of scientists, is of an exceedingly cold nature. Some say it is of a warm and wet nature, and knowledge comes from the brain, either very cold, or warm and wet; it therefore follows, that if the eye looks at an object of the same nature as itself, such as the stars are, namely, that of fire, each object being attracted to the gaze of its affinity, the eye has the quicker perception, and this is derived from the soul.

Nephew: And when the eye is closed, why does not sight depart altogether?

Uncle: All things sustain their strength and power by resting, so that the air from which sight proceeds gains in natural strength by resting; its aspect is improved on all sides when the eye is again opened.

QUESTION XXX.

[Bodl. —; Ad. ? XXVII.—XXVIII.]

Why does the soul receive the sensation of sight?

This anxiety shall be to thy gain, and thou shalt laugh at the latter day. For know, *Nephew*, that the seat of the soul is, as I told you, in the brain, and from it are derived all the sensations and impulses of the will. You know that five senses serve the soul, and they are as follows: Sight, Hearing, Taste, Smell, and Touch. What the eye sees abroad it tells to the soul by means of the nerves that receive the sight, and so with the remaining sensations; for all the nerves of the hand, and all the cords in the various members, pass from the brain. Eyes and ears are the most sensitive of all, with the exception of the heart, all of which partake of the same composition.

QUESTION XXXI.

[Bodl. 17; Ad. XXIX.]

Why cannot a man see his face in glass?

You gain wisdom from the utterance of the wise, though it be concealed from the simple. Now, Uncle, tell me why cannot a man see his face in glass, while he can see it in a mirror made by himself?

Well asked! Hear and understand that the eye is the foe of darkness and gloom; therefore the clear view is on the side of the eye, and the darkness is on the other side. The range of the eye extends as far as the dark part, and not beyond; and what is seen is reflected to the eye, and it reports it. But ordinary glass, which is transparent, sight penetrates, and the thing is not reported to the eye.

QUESTION XXXII.

[Bodl. 18; Ad. XXX.]

Why is he who stands in the dark not seen?

Do instruct me on this point, why he who stands in the dark is not seen by him who stands in the light, while he who stands in the light is seen by him who stands in the dark.

Uncle: First, you should understand and know that light and darkness are the negation of each other; and the eyes, as they look into darkness, find no support or fixity, wandering from the path, and gazing in vain into the air, for by nature they move about, and long for that which is on high. But when they gaze towards the light, from which they originate, since sight is from the soul, which is in the brain, which itself is the light of life, they feast on their kind, looking at the light which by nature was created from the same matter, the onlooker being over against it.

QUESTION XXXIII.

[Bodl. 19; Ad. —.]

Why are not the eyes at the back of the head?

O honoured and beloved Uncle, teach me further, why the eyes of man are not at the back.

Dost thou not know, Nephew, that there are three chambers in the brain—the first for seeing, the second for understanding, and the third for recollecting? The first, which is in the middle of the brain, sees an external object, and reports it unto the second, until it grasps it; and the second—the brain proper—reports it

unto the third, for the purpose of recording it, the seat of which is at the back of the head; and if the cavities of the eye had been near the third portion, they would have been the seat of memory (not sight).

QUESTION XXXIV.

[Bodl. 20; Ad. XXXI.]

Why does the nose smell, the palate taste, and why is the hand the organ of touch?

O Master, when I considered thy words I found what was right; but when thoughts went astray within me, I sucked the venom of asps, and my struggles became like those of Esau against his brother. Why, I ask, does the nose smell, the palate taste, and the hand become the organ of touch? How does all this come to them, so that one does not do the work of the other? I ask, why? Certainly not in any spirit of ill-will; but "if I am not for myself, who will be for me?"

Uncle: My dear Nephew! If doubts rise within thee, leave them alone—a sweeping rain, leaving no food; but I will receive your enquiries, believing you to be perfectly straight; and I place myself at your disposal as a target. Concerning these three sensations, smell by the nostril, taste by the palate, and touch by the hand, understand that each one organ has been designed to do its special work through the medium of objects external to them. Of themselves they could do nothing; the nostril could not, unless there were outside something present to smell, either something sweet like apple and spice, or something unpleasantly unclean, and the air generating fumes from the object present, and that air reaching the nostrils, and thus producing the sensation of smell. It is not, as you thought, that the aperture of the nostril near the mouth is the cause of smelling; for if the hard membrane which is to be found inside the nose were cut, it would yet be able to smell. But as regards the hard part of the nose between the two eyes extending to the palate, called in Arabic, "breasts of smell," if that were stopped, it could not smell at all. It is formed on the plan for smelling, and its passage is to the brain; it is firmer than ordinary flesh, yet softer than bone. All this is so designed, that it can smell quickly and hurriedly; for there is no power in the muscle of the body equal to that in the brain.

Such is the organ of smell; and similar conditions govern the other four organs which come from the brain, and reach the palate and tongue, called the organs of taste. There are the well-known nerves which course from the brain to the hand, and become the instruments of touch; for the hand distinguishes

between warm and cold, and this by reason of the brain nerves which come from the soul. One does not do the work of the other; the hand does not smell, for it is not formed on the pattern adapted for smelling; the nose does not touch or taste. May all this knowledge be welcome to you!

QUESTION XXXV.

[Bodl. 21; Ad. XXXII.]

Why does a man weep in the hour of joy?

Silently do I regard my position, and continually is thy law upon my tongue. Therefore, do thou now enlighten me upon this point, since thou knowest I have loved thee above all creatures, and hence also have I loved thy heart's reflections. Now, when you were in Tyre and Zidon, touring all the districts of Philistia for a long while, so long that we gave up hopes of you, and I never thought to see you again, and when the good news reached me that you had got to your destination safe and sound, and I went to welcome you, and to give expression to the joy of my heart, oh! how I embraced and kissed you! But why, then, in the very moment of my extreme happiness, did my eyes flow with tears? Whence and why did weeping come, when there was every occasion for joy?

Uncle: O Nephew, you are trying to trample upon the honeycomb; while surely thou knowest that good tidings makes one grow fat; thou knowest too, that joy broadens man's heart, and engenders warmth in the human frame increasingly in a short time—a varied form of heat, the fumes of which rise to the brain at the time, and the moisture which is present therein becomes reduced, and there is movement in the fresh moisture which begins to travel, so that water flows from the brain to the first apertures at hand; thus it is that water flows from the eyes.

QUESTION XXXVI.

[Bodl. 22; Ad. XXXIII.]

Why do cold and heat proceed from one mouth?

O Uncle! Let us examine on this head what the wise men have opined, why from one and the same source do there issue forth both hot and cold.

O Nephew! Both the wise man and the fool are silent on this subject. Understand, however, that all the wise ones of India agree and are clear on this head, that all the winds of the body come from the lungs; they come one way and afterwards disperse; their passage does not vary. You should, therefore,

know that heat chiefly coming from the lung hurriedly and without interruption, as quickly rises to the mouth; and when it finds the mouth open, it comes out hot, as it comes straight from the lung; but when it is neutralised on the way, coming in contact in the mouth when closed, and obstructed, through coming into collision with the wind entering through the nostrils, it turns cold; for nothing among the four elemental bases of life turns more quickly from hot to cold than air.

QUESTION XXXVII.

[Bodl. —; Ad. XXXIV.]

Why do men blow into the face of another to cool his heat?

Understand that when I was in Zoan in a fixed dwelling (*lit.*, "in a tent that did not wander"), I heard a Wise Man questioning his fellow, and saying, "I have a great question to ask." And he began: It is known that everything in a moveable state becomes warm by its own motion, for this is the way of all bodies; why then do men race and rush to blow air into a man's face to cool him from his heat? And this is what he replied: 'Tis true that all things in motion become heated; it is a natural law; but the breath in man's body is so very warm that it ultimately comes out in perspiration through the air travelling outwards, while the air and breath coming from without, although it is warm enough to be brought to a man's face to cool the greater heat that comes from the interior of his body, yet when the outer air reaches the inner breath, man becomes minus both of them, neither hot nor cold. On my return I pondered these things, realising that the questioner was right, and also he who replied.

And though I heard this, I did not quite understand, since from my youth I had learnt that all things of one and the same nature become increased when added together, while those of unlike kind that do not resemble one another become reduced, and ultimately neutralise each other. How then can we believe that the warm wind can cool and chill the breath which is warmer than itself?

Uncle: The man who answered thus came very near the truth, and I agree with him with regard to his admission. And when you say, how can the warm breath be cooled by the warm wind, you may compare it to warm water which becomes cool by means of luke-warm.

Nephew: If you bring me proof from water, I will adduce fire in proof of my contention. See, you wish to cool a big pile of wood upon which the wind is blowing and setting alight, and

near it there is a small fire, which you cast into the fire caused by that which has kindled the big pile. Will it not make the fire of the pile bigger, and appear to human eye greater and higher than before, and the greater the strength the greater the heat, because the greater the quantity of wood the larger the conflagration? So I say the warm wind from without adds to the inner heat (of the human body) still greater heat.

Uncle: Your ideas are entirely wrong, when you compare fire to water. Say! what connection is there between straw and corn? Dost thou not know that water is cold by nature, and if you heat it, you expel its original nature, and change it to that of fire? But if you mix luke-warm water with hot, it is a little thing for them to quickly turn to their original character; because fire, being by nature of greater heat than anything else, if you cast into it a little more fire, it is easy to add to its original character, and make it burn all the more fiercely.

Nephew: This but strengthens your contention that luke-warm water cools the warmer, because it is not alike warm in character, while there is some compelling force in the body which causes the cooling; but in the case in which two things allied as regards heat, one hot from within and one hot from without, and there is no compelling power to cool but to increase the heat, for the nature of both is warmth, one ought to increase the heat of the other, which would be natural; for it is almost an axiom: Add something of the same nature to a thing, and you increase it.

Uncle: According to your stubborn opinion, the comparison between water and wind does not seem agreeable to you. Nevertheless, the air from without being warm, and the breath within man being warmer still, when the former comes to be driven and blown, and the outer air supervenes and is added to the warmer breath of the body, the latter *nolens volens* is traced along the path it came, and it re-enters the body. The outer air bides its time, but this circumstance does not beg the question of the two breaths mingling; it is simply that the inner one is driven further in, and the outer one is received. It is for this reason that people blow, to chase the warm wind into the body, to bring in the outer air in its place, depending upon the zest of the on-coming blast, and the power of the other to remain in its place. Such is man's constitution. Do not think that this co-mingling of outer and inner breaths is similar to that of water with water, or fire with fire, in which case one comes in, while the other comes out; for this breath comes into a man's face, and having a cooling effect causes the warmer air to be driven in, and it takes its place, not having attained to its degree of heat.

QUESTION XXXVIII.

[Bodl. 23; Ad. XXXV.]

How is it that the throat is able to bear greater heat than the mouth?

My house-friend did turn his thoughts to me as to the seat of learning, asking now concerning the members of the human frame, and with his questionings bewildering me and mine, so that I alone escaped to give the reply. He asked me: How am I able to bear hotter food in my throat than I am able to bear in my mouth?

Hearken, Nephew, and I will speak and indite words for thee! When thy friend relied upon thee, thou wast unto him as a broken reed; for in such matters thou hadst to infer one thing from another. Hast thou not heard that the organs nearest the heart and the lungs are warmer than those further removed? Thus the throat is nearer to them than the mouth, and it is therefore the warmer in degree; and the warmer organs can more easily bear the heat which is allied to them. And even though the organ of the mouth is warm, the heat of the throat is greater, and the mouth cannot endure its heat, for it is cold in comparison with the outer heat that enters into it. When, however, food enters into the throat, there it is a matter of equal temperature, or near to it.

QUESTION XXXIX.

[Bodl. —; Ad. XXXVI.—XXXVII.]

Why are the fingers of unequal length?

O Uncle! Let us enter now upon a path not to be esteemed lightly, for open criticism is a good thing, and it happens that my faculties have not been sufficiently instructed to meet their needs, else my lips had uttered knowledge with clearness.

Now, therefore, teach me why the fingers do not reach each other, seeing that they are not of equal length.

Uncle: Even in this matter I will open my mouth to you. Dost thou not know why the hand is of hollow shape? Why did you not feel yourself constrained to ask your question in this form? For know, that Creation has supplied man with every requisite, and there is no organ in the human frame so like a vessel as the hand; that when man wants to drink water, he may fill his hand with it, serving as it does the purpose of a vessel; on that account it is hollow in shape.

Nephew: You are teaching me concerning the hollow shape of the hand, but not concerning the fingers.

Uncle: The reason why there is inequality in the length of the fingers is just because the hand is hollow; so that if you bend them in circular form, your hand will be arranged as a perfect whole. It is necessary for the hand to be shaped hollow so as to be able to grasp and hold things. If the fingers were all, say, of the size of the thumb, the hand could not take hold of an object, without its dropping from its grasp.

QUESTION XL.

[Bodl. 24; Ad. XXXVIII.]

Why does not the child walk at once?

O *Uncle*, since we are engaged with the conditions of man's formation, let us examine our ways and search to know why the new-born child does not walk, relying upon its feet, like the domestic and wild animal.

Uncle: Pay attention, and you will see that his members are more tender than that of the brute, and he has been created upon the plan that he walk with stature erect and upright, so that he might look upwards towards heaven, which is a very great and different thing from the arrangement in the case of the creature walking on all fours.

Nephew: These two points also are difficult for me to understand, and I cannot grasp them.

Uncle: According to observation and hearsay we know, and it has not been concealed from us, that the Almighty, blessed and exalted be He, created three Worlds, the lower one, formed of various degrees of plant life and such like formations, while man alone who lives thereon belongs to the highest degree; the second world consists of the heavenly hosts, the stars and the constellations, and called the middle world; and the third world, high above this, is that of angels ministering to the Creator, the soul of man being created from their effulgence, and receiving the higher power according to the grade of the angels' ministry.

We, therefore, know that man's soul is high above the lower world, and is designed to recognise therein the works of its Creator. Those who walk on all fours, however, were not created for this purpose, namely, to acknowledge the works of the Creator; only in the case of man do we find the Scriptural text applied: "Thou didst crown him with glory and honour" (Ps. viii. 6), and this but on account of the soul with which He endowed him, being itself the light of the Angels derived from the light issuing from the Sun.

If this soul leaves the desires of the lower world, it is able to rise by rapid degrees, and to receive great strength from the

higher power which it has received by means of the Angelic Light. This is a subject that requires much explanation; yet the wise will understand what I have said from the hints which I have given, that the frame of man is weak, and that in stature he is by nature erect, and that this natural condition is called "*Neshama*" (soul). Attend to these two considerations, and this will elucidate the cause of man's condition of walking.

It is the higher soul placed in man that endows him with the will to be cautious in his actions, and to strengthen his limbs as an expert would in his business, without his possessing big bones, or the other limbs of the brute creation; but to work with his hands such things as should be done in accordance with the soul's character and its requirements, such as to stitch and to tear, to reap and to sow, to receive and to distribute. For these purposes the worker requires more delicate members for use and labour as he desires, and not such as are on the plan of the animal which has been created for man's sake, such animal requiring big limbs and bones like a bar of iron, strong as beds of copper, expressed in the phrase: "There is much increase in the strength of the ox" (Prov. xiv. 4); it has been created for many purposes, such as to draw things by the yoke adapted for carrying burdens.

I have now made known to you why man has tender limbs; and from this you may infer the connection between the high position and state (of the soul) and the matter of man's erect and tender frame—ever looking heavenward, turning unto Him that created the soul, and to the Source whence she, man's support, was hewn, lest she be defiled and soiled by the dust of the animal walking on fours. She has chosen her place in the head and the brain, saying, "Here will I sit for security"; this is the spot whence she can survey the entire body beneath her, it being her wish to preserve the body in the state in which it had been handed into her charge. From this you may learn that not for nothing did God create man's limbs tender, and his frame erect; and just as man's limbs are well fitted for his doings and his actions, so has the animal of bony dimensions been formed for its work, its "*Neshama*" (soul) tending downwards, towards earth.

QUESTION XLI.

[Bodl. 25; Ad. XXXIX.—XL.]

Why is man reared at the start on his mother's milk?

O *Uncle*, you might seek and not find a man to quarrel with you regarding man's formation, and the purpose, according

to your view, for which his limbs were adapted at Creation, for the heart of the wise will bear testimony to all this. Now I have prepared in my mind this strong stumbling-block for you, to tell me why man is brought up on milk, since it seems cruel, and a degradation for the mother, nor is the habit proper.

Uncle: May the ears of the deaf perceive! Have I not written for you times out of number, that all things are reared and strengthened by means of that which is of its own kind? Now understand, that the child is entirely from the blood of the woman, and after it comes forth to the light of the world, the blood in the woman turns and becomes milk, and it is on this account that the new-born babe is brought up on milk, which is of its own kind. Now since mankind adopted this habit from the first, we have to say that it must have observed the habit of the wild animals and the sea-monsters, which drew forth their breasts to suckle their young, and men did the same to their offspring.

Nephew: Let thy adversary approach, if he would marvel at thy words, that milk is a child's natural food, and that it is soon driven off and weaned from it; and if it be as you say, why is milk not good for youth and old age, seeing that it was their earliest nourishment?

Uncle: For several reasons milk is man's first nourishment; for the sake of haste, owing to the tenderness of the limbs; as one thing is necessary for bringing up tender children, and another for the more hardened youth of years; a third is adapted for young females, another for more developed ones; some things for limbs more perfected, and others for those not so well matured. But I am not the man who wish to assert that woman's milk would be hard for youth and old age, if the milk of those who walk on fours is hard for them, but it appears cruel. This is the view of those who feed on it or sip it.

[There is something wanting here.]

QUESTION XLII.

[Bodl. 26; Ad. XLII.]

Why does a man become infected in the act of coition? Deep set in the lap of wisdom are thy reflections, and thy thoughts come like burning firebrands, therefore do I long for thy words. Now, therefore, Uncle, tell me why when a healthy man lies with

a woman, and gives her of his infection, she does not contract the disease?

Uncle: If you wish to know the cause and reason of this thing, pay attention and understand the nature of man and of woman. Man is by origin of a warm nature, and woman cold; and the warmth in man is traceable to his dry endowment, whilst the coldness of woman to that of her moist endowment. Hence when the woman receives infected seed coming from that which is of a character both hot and dry, her cold and wet nature resists the infection, and admits of no chance of being spoilt, (for no cold and wet thing will draw to itself the warm and dry). It therefore happens as regards the seed sown in her, that it does not lose its character or strength, for at the time when a healthy man introduces into a woman such and similar dry and warm properties as they exist in him, in the process of the discharge the warm goes to warm and the dry to dry; since just as that which is cold and wet repels that which is warm and dry, being of contrary nature, in the same manner does that which is warm and dry attract that which is of a kindred nature.

QUESTION XLIII.

[Bodl. 27; Ad. XLII.]

Why do women who are cold, have a greater desire for their husbands than the latter have for them?

The replies of my Master have rent my questions, and swallowed up my words; and I walk about all my years drenching my thoughts with thine; and so this question has come to me, and is like a stone in my heart, until thou bring forth my soul from this distress.

Why, I ask, does a woman long for the man more than he for her, especially as you say that women are cold by nature? According to nature, man should have the stronger desire, since his nature is warm.

Uncle: The cold in woman has nothing to do with this desire in her; it is the moist in her which is greater than in man. Understand, it is for this reason. On account of woman's coldness, her blood cannot become oxidised in her to the same degree as in man, who is warm. Now the blood longs to get free, and it is necessary that it be set free by means of man's coition and by the escape of semen; the semen in woman is but blood of whitish hue, and it is in consequence of woman's coldness that she desires the warmth of man; this is the way of cold objects. You know that serpents on account of their cold nature enter

into a man's mouth while he be asleep, just on account of man's warmth.

Nephew : How is it that the blood in woman is cold, and the moisture greater?

Uncle : The blood boils through the membranes attached to her person, her nature rousing her to expel the blood from her inward parts in such a manner as to require the male; and although the man might by the act run the risk of infection, she, on the other hand, does not contract the disease, unless it be through the following three things: bearing children from the man, drawing to herself some poisoned breath of his, or if her natural condition gives her an extraordinarily strong degree of warmth, and her heat is greater than that of women generally, who are cold.

QUESTION XLIV.

[Bodl. 28; Ad. XLIII.]

Why does man part from life, and die?

My master is trampled upon in the House of the Wise; they plan hidden devices to capture him, and to obtain answers from him. Then make light to answer this questioning of the untutored, and say at once, it is a hardship to part that which has once been joined—this is known of all objects. And yet we are convinced that all is measured out by the rule of righteousness, and the line of equity. Nevertheless, it is the duty of those who would be wise to know and investigate the conditions of this lower world; and to learn by experience wisdom and device, to understand one matter by help of another, and the reason why. And since I have wearied you with subjects regarding Life, do not be angry if I dwell upon the subject of Death, and ask you to give some little heed to him who enquires: Why does man part from his life, and die?

I am not now asking concerning those killed, who die untimely deaths, the cause of whose end is known, but I ask about those who die not the violent death by being killed or being drowned. Man is created upon the plan of life, and there is no combination more lovely than that of body and soul, since the soul has set her dwelling according to her desires, and from her fixed abode she looks down upon her whole body to direct it according to her will, as we have already explained. The one is attached to the other, and she sends forth her cords and sinews to hold the body, and they are held fast together. Why then this parting, after the soul has acted as the Watchman over the tower of strength? Teach me, therefore, Does this divorce between body and soul take place by mutual consent?

Shouldst thou reply to me and say, This soul is bound to come forth from the body by God's will at the time when He draws nigh to destroy the "*Nephesh*," to turn it back again like the clay of the seal, and the very parting bears witness that the soul departs from the body unwillingly, as we see the body in pain, rolling and groaning, lamenting and writhing before it departs, like the parting of two friends, the knowledge of all mortals that they have to die making them afraid of death; if you retort thus, I would say to you: Since the dissolution takes place by Heaven's will, and against man's wish, why does the soul go forth from the body with pain and difficulty, seeing that at birth it joins with the body silently and easily, artfully and without sensation? Why should the dissolution occur amid weeping and groaning, when the mating was so sweet and desirable? Further, why does He allow them to part? It would be such an easy and pleasant thing to keep them together in matrimonial alliance; it would be nothing to make them one. Moreover, it seems such a right arrangement for them to be together. And now, since the parting is against their will, for they have a joint life and pleasurable residence, how comes it that they do not remain together for ever? And if this be by the will of Heaven, then stand and consider the marvels of Him perfect in knowledge and instruction. How hard will this parting be at the time of the end (*or*, awakening), so hard that they will be too weary to sustain it, unable to bear it!

I have thus made the question more difficult; yea, I have found pleasure in fathoming its depths; and you too will be as gratified as I am, possibly as pleased as you would be "with wheat of Minnith and confectionery," in turning the matter over and searching it through and through, and you will reach the goal, purifying your heart from all doubts.

The first part of the investigation will be, to know in what way the body relies and supports itself upon the strength of the soul, how to find its support for the duration of life, for there are bodies that do not depend for their support and sustenance upon the strength of the soul; there are bodies that at times wander away, and at other times remain. We must therefore know that when the strength of the body fades, the soul loves that body, and in its love for it, it supports it, and keeps it alive. It sometimes happens that the junction of the body and soul is not a mutual suit, nor is their dwelling together, since something repellant is found in them, and the soul has therefore no concern in disappearing from its body, the two loving each other merely as friends, the Creator having made them like such from birth, when they are found to be of one and the same nature. Of such are the bodies in this lower world, created upon the right principle,

being compounded of the four elements plainly stated above—fire, water, air, and dust.

And whatever the soul finds in the body, it is something of equal or nearly equal kind, and she on that account draws near to it and dwells in it, for she is derived from the higher souls, and therefore loves the thing which is of equal character and according to the rule of equity, namely, man's body. This body requires great caution with regard to the four roots of things, so that, for example, fire should not have a preponderating weight over the three others, and gain the mastery through its nature, or that the weight of the element of dust be not too much; for everyone has a limit and fixed time to live according to the quantity of natural heat and moisture, not the strange fire and foreign moisture, which is the very contrary to his own. Now, whenever the soul finds these four bases of life of equal measure, not one gaining the mastery over the other, or finds it approximating its origin, it is delighted to dwell therein.

There are, on the other hand, certain bodies in the lower world that are not of equable temperament, but are unnatural, like stones and timber that cannot easily catch fire. There are objects, too, in the middle world, namely the heavens, called stars and constellations and luminaries, which are of equable nature, they are *Neshamoth* (souls) that have neither beginning nor end; they cease not in their motion, but move along, some in a straight line, some straight but backwards, yet right in their courses; some descend, others ascend; some hasten, some tarry; and therefore the bodies of men are sometimes equable, and at other times journey from the straight way; they sometimes move, and sometimes rest. The soul is found by them according to what they draw from the four elements, and remains in them in proportion to their resting and reposing in them; but when these elements depart from the body, the component element of fire becomes likened to fire, air to air, water to water, and the bones which are cold and dry return to the dust, their own principle. These are the foundations of the body, just as beams form the foundation of the house.

[Bodl. —; Ad. XLIV.]

How does the healthy one spoil his elemental conditions, and how are they wrenched from their healthful state?

Thy word is better to me than the best morsel, at the time when thoughts break through my frame, and release my mouth from the bridle.

And now, Uncle, I will not rest on my lees, until I gather the gleanings of thy vineyard, for "my beloved hath a vineyard

in his corner," which his light has planted (or, in which he planted his light), and it has become a fruitful vine to those who have wavered in judgment. Deign, therefore, to instruct me as to how a man first becomes detached from his original health, after, as you say, he was created upon a right model, and strengthened by the four root elements, sustained by proper association, and the body grafted upon the soul; whence the cause that his original well-being takes leave of him?

Uncle: I will make this my secret pleasant to my Nephew, for it is laid up with me, and sealed in my heart, replying briefly, yet not stinting in disclosing my thoughts. Apply thyself to know that everything that destroys something else will in turn become destroyed by that which it destroys—*e.g.*, ploughshares, axes, hammers, and hatchets. Dost thou not see as regards the hatchet used in felling trees, in splitting one portion into several pieces, and thus destroying and dividing an object into parts, that its beauty (newness) is changed and becomes spoilt, for by use the iron becomes blunt, and its form is gone; and so with the ploughshare in ploughing, and so with the knife and blade used for bread and meat; as long as they themselves are not spoilt in their employment, they work mischief. This is the way with everything that acts upon another, that self-same object will in time act upon it.

Man's body works by means of its food, its victuals, which it grinds, and cooks in the stomach, and the food acts upon him, changing his nature and his elemental condition, expressed in the words, "And the grinders cause him to cease" (Eccles. xii. 3), [*Berachya's own reading into or application of these two words of the Preacher*]. It comes to this, that while the character of food is changed by means of the bodily organs, the nature of the body becomes changed by the food it takes, hinted at in the words, "When thou shalt have ceased to spoil, thou shalt be spoilt" (Isaiah xxxiii. 1). If you examine the matter closely, you will find that such is the case with all things. It thus happens in the same way, that if the soul wishes to rear the body, and to sustain it by means of eating and drinking, it will pull it down by means of the food itself.]

QUESTION XLV.

[Bodl. 29; Ad. XLV.]

Why does one who has eaten to satisfaction long for food in a short time?

O Uncle, thou hast made thy Nephew say, "Thou art honoured and esteemed in the eyes of all men." And now, after all this, there proceeds from thy mouth the statement that the

passive becomes turned into the active agent, and the despoiled into the spoiler; and that it is in this manner that we have to account for the structure of the human frame becoming demolished. Tell me, Why does one who is full desire in a short time more food, being hungry?

Uncle: O Nephew, even this I can tell you. Although ordered and ordained by nature it is an extraordinary feature for every living thing has other characteristics well-defined and known which enflame and keep him alive. These come from air, according to the law that parts of the great and mighty body co-exist with parts resident in the body that are compounded of the four root-elements that come from outside of the body, namely, fire, water, air, and dust. These four elements act in this way; they destroy what they find in a body as external. First as regards flesh, man is brought up on it, expands on it, grows up strong and tall, and when it enters the body the blood is abstracted by means of these four bases, and it converts them from their proper proportion. Thus come about both the waste and the support of the body; for, owing to the waste and analysis in the body, it happens that it loses something that should go to its maintenance and natural support. For instance, when he crushes fine the food in the body, and it is destroyed, it is necessary that it come to an end; and he therefore eats a little, so that what he eats now shall be over and above that which he had lost in the process of digestion. Therefore it is a saying: "He who does not give out what he likes, will not take in what he wishes," meaning the body, which gives up a little in order to add to its nourishment, when, after analysis and separation, the body loses what it receives, and it becomes necessary to add to it on the side of what it has lost, and to bring into it something to restore the balance. If this were not done, the body might overdo matters and become surfeited, or even partake of that which is abhorrent to it; and by deviating from the right line, the divorce of the partnership ensues. Now pay heed to this answer, and you will no longer have cause for anxiety.

[Bodl. 30; Ad. XLVI.]

QUESTION XLVI.

Why are the living afraid of the dead?

All the members of my body are in harmony with thy counsels, and obey thy words, for they are pleasant; but among them there is a secret regarding the origin of the experience, as to why a living one should be afraid of a dead person, one to whom he had been attached in life-time. It would seem that in death

both hatred ceases, and love is lost; then what harm can the dead do to one?

Uncle: He who bringeth the dead to life, and causeth the living to die, has planted the instinct in the heart of all living to love and attach to itself the thing that is sustained in its original state, and to shrink from that which is destroyed in its proportions, and there is nothing that maintains vitality like love, or destroys it like hate.

Nephew: This is not unknown to me, and what does this reply of yours teach?

Uncle: You are to understand from my utterance that which you yourself have confessed, that all life is fond of life and its continuance for ever; how much more so man, who has the knowledge of higher things and their maintenance in this world? Life is really the association of body and soul; and it is therefore necessary that all living should love this association; and having once liked the association, why should he not hate the dissolution? From hating the dissolution, he comes to hate the factor, which is the body, seeing it, as he does, bereft of the soul. This hate does not arise from the sense of fear in the body—the biggest fool would not think so, but from the thoughts which the parting calls to mind. The wise ones have therefore named this feeling hate, not fear.

Nephew: I just remember what you said concerning the course of the waters revolving in a circle; if this be true, there is no source nor fount in the world which is ever parted (*i.e.*, what the Arabs call "En"); I mean that, once going round and round, it will never return to its original channel.

Uncle: You have put a difficult question; bring forward your ideas in proper arrangement, and the wise of heart will search and sift them, as they present themselves in the chambers of your thoughts; for many a one seeks, and does not find out why the waters revolving (about the earth) cannot be called "fount" or "spring." And now for your instruction, to make you understand the subject better, I will make this comparison.

The moisture in man's body which issues in the form of sweat is called "a rebuke" (indecent); and so we can speak also of the earth's moisture, which oozes out in many places where there is slackness, and from which drops issue; they are so many sources in the earth's foundations in which moisture exists, and from which mists arise in consequence of the sun's heat, and the earth, compounded of the four elements, is bedewed and sweats; for we know that the earth does not cease to ooze forth sweat, and the drops join together, thus forming "the spring." And what is the usual experience in regard to the earth? In summer-time if the slightest moisture issues from it owing to the upper

heat, called "*sharab*," it becomes dry and parched. They who betimes drink of it have come upon water-holes without finding any water; whereas in winter, owing to the richness of the soil and its moisture, the waters return to their former state.

QUESTION XLVII.

[Bodl. —; ? Ad. LVII.]

How does hot water come from the spring?

Slumbering upon my couch, I spake unto myself, and in the multitude of my thoughts, I was pained to think of the ways of the brooks and their taunts, turning backwards and flowing into the river (*or*, to the mountain) and the valley; but with regard to the hot water (from the stream), I know not the why and the wherefore. For when I was in Tiberias, I bathed in the hot water of the great river, and I could not understand the cause and reason of its temperature. I, therefore, did put my hand to my mouth, but now speak of this matter till thou givest me to understand the cause of this procedure.

Uncle: Even in this matter I would reply to you, I will not leave you nor forsake you; but as a father giving unto the wise cometh wiser still, so though you will profit, I should not be the loser.

As I told you, you should know that the whole earth is a network of mines, which bring forth after their kind, teeming round about with sources of silver and gold, others of copper, iron, tin, and lead: then again, there is the source of the stone quarries or the mines of brimstone, which is a kind of earth inflammable, having smell, is volatile, yellow, with a blue flame, and it is on this account that the water is hot; for as the water flows from the sides of the mine, the springs become hot by contact, just like lime when you throw water upon it, and these have healing properties. If you do not believe what I now say, you should go to such a spot where this water boils, and you will see it boil sulphuric; then you'll confess to the truth, and find such to be the effect.

QUESTION XLVIII.

[Bodl. —; Ad. LVIII.]

Why does water flow from a vessel with a hole in it, when the stopper is on it?

Let not my lord be angry, if I speak yet again with reference to the nature of water, for I still have some doubt on the subject. For when we left Rameses to go each one on his way, I did not rest until I came to Zidon, and was detained (*or*, "entertained")

in the house of a high personage; and when it was meal-time, one of her servants came and poured water over our hands out of an extraordinary vessel, which had holes in the bottom, and from the holes flowed the water which was poured over our hands; but it happened that when he put his thumb upon the aperture on the top of the vessel, the water remained, and did not come out, but when he removed it from the vessel's mouth, it flowed. When I saw this, I thought that the mistress of the house was a witch, for so did her servant say. The thing went forth from my mouth, and all who listened to me laughed at me. Then said I to them, teach me and I will be silent; but not one of them enlightened me on this subject. Now, therefore, O Master, tell me if I have made a mistake in calling her a witch; or does this thing proceed from natural causes? I have laboured much to understand this, but have failed.

Uncle: He deserved to be put in chains for attributing the virtue of the vessel to witchcraft, since this did not come about either by the skill of the mistress of the house, or by the skill of the servant, who poured the water over thy hand from a vessel, which from the first was brought out by its maker in this fashion.

Hast thou not heard that the root-elements of the world, namely, fire, water, air and dust, have a way of associating, and you do not find any action of one unassociated with that of the other; and when they work in unison in any case, they hold fast together to the finish, and there is no empty spot (vacuum) in which one of these would not be. Now, not one of these elements is nearer in character to water, to take its place, than air, and for this reason: Water, like air by nature, is flowing and wet, which is not the case with fire; for even though it moves, it is dry, whilst dust does not move. It is, therefore, proper that air should take the place of water which moves, and is wet like itself; and when water runs along from its place, and turns into its way, it is necessary that the other, namely air, similar to itself, should fill its place immediately. Now if water be stopped and its second comes, seemingly to take the place of its associate to which it is attached and which is unable to come there, that element which wishes to come forth cannot be released, for it cannot find an outlet. Now, when the servant in pouring out makes a way for the air to enter the vessel, the water would come out, and air would come in; but when the entry of air is stopped, so that it cannot get into the mouth of the bottle to be in the place of water, then as the two natures are so bound together as to change places with each other, how can the water come out of the vessel? For as the air comes in, the water comes out, provided that the holes be not too wide to bear the weight of the water.

The wise of heart will rend the enclosure of his heart, so that wisdom laid up within him might enter in its place; and he who has crushed thy chief points shall fill his mouth with gravel, since they are all straight, and easily understood.

Now, dear Uncle, we have discussed concerning fire, and water, and dust. I would now indite my remarks concerning the wind. I will speak so that it may profit me; the subject of the winds worries me, to understand whence they come. Do thou, therefore, now speak prophet-like concerning the wind.

QUESTION XLIX.

[Bodl. —; Ad. LIX.]

Whence come the winds?

Uncle: "I am not a prophet"; yet, after much toil, I have learnt something of the nature of the wind; and to thee and thy likes I will tell, for neither price nor reward, that which has not been hidden from me.

Winds come partly from the earth, and partly from the water, as is patent to the eye. They do not come from the deep sea. When the sun passes beneath the earth during the night, the earth becomes heated, and from the slack places there proceed moisture and heat; a mist rises from the ground and from the waters thus warmed in the night by the power of the sun and stars. Even with the rising of the billows of the sea, its waters are shaken up, and the air is increased, so that it rises, and is carried up on high like smoke. This air is dense, and accordingly, in rising, moves hither and thither. I call this air "dense" for this reason, because there is atmosphere which is "light," namely, that which is nearer the firmament, in which there is no wind, moving as it does by virtue of the wind nearer the earth; for where there is stillness, there is no wind.

QUESTION L.

[Bodl. —; Ad. LX.]

Whence comes the first movement of the wind?

Nephew: If it be as you say, that the wind has its movements from some outside source, it necessarily follows that air moves even when the wind is still. Now see, if you find the air still, and the other is moving or still, if it be very still, it will not rob the other of its quietude to set it in motion. This being so, that which moves does so by force of another which is itself set in motion, and that other moved by a second, and that second by a third cause, *ad infinitum*. Then the movement of the air is without beginning.

Uncle: Do you not know that by nature fire is cold, and it need not be roused by some extraneous power: so it is with wind, which is air; its movement is inherent in itself, without any other moving agent; and by nature it is quiet; it consequently comes to this, that air moving by force of something else is moved by something that is still and does not move, for naturally the atmosphere causing movement of the air must be a moving agent, though itself is neither stirred nor moved, inasmuch as it is still and quiet.

QUESTION LI.

[Bodl. —; Ad. LXI.]

Can a small object (an atom) set other things in motion, since a thing that drives is not fine?

Nephew: You tell me that original creation is not moved, how then can it move other things, itself being still? On this matter I am in the dark; for the thing that moves and chases another thing must move by virtue of its motive power in acting upon the subject moved from its position, and becoming settled down and resting in some other position when at rest, in the place from which it has chased some object in consequence of its usurping the spot. If this be so, then a fine object which, on account of its tiny size, is indivisible, like the atom (*I read Abne-Ha-shemesh*), tell me if, when it be moved, all similar things are moved; for there is no particle which has not its own place, and according to what you say, it will go on moving other objects *ad infinitum*. If this be true, it follows that the wind, once having begun to set things in motion, has no end and limit to its moving and driving power.

QUESTION LII.

[Bodl. —; Ad. LXI.]

Whence come stillness and rest?

Uncle: My nephew should in his impatience during the twilight of his learning, suffer his light to measure his path, speaking as he does to gain knowledge, and to increase his strength.

In truth, the wind does find a limit to its power of setting in motion; and I still hold fast to my statement that everything which itself moves and wanders about will move and chase other objects, although this movement will not be lengthwise, from end to end, but orbicular, revolving in a circle to the place from which it goes forth to move. And this motion of the wind being

circular is similar to the motion of the waters which go round in a circle; and concerning your statement, that once setting in motion, there is no limit to its activity, understand, that it will be limited by the blowing of another wind, when the latter comes to meet it, and pushes it along, so that it is unable to pass. Hence the cause of the Sun's specks (atoms) and of the wind carrying out their movements and settling down in circles.

Now this wind which is overcome by impact will be again chased by another to which it has to give way, and this is the characteristic *ad infinitum*; for each wind-blast pushes another; and it accordingly happens that the movements interrupted in places in the waters are necessarily resumed, until they push on together, and by their overwhelming power find their rest and calm, when once meeting again they are quiet after their motion. This is the utmost limit of the winds, when they find rest. Now from the impinging of these "specks of the Sun" that go round in a circle, you may learn this thing, that they are thrust along by the force of something else which thrusts it along, since a small single object could not impart its motion to all of them, and the motion once begun will find its limit, as I have explained to you.

This was the interpretation given by the *Uncle* to his *Nephew*, an explanation which will be understood.

In the same way does Ibn Ezra explain the words of Ecclesiastes (i. 6): "It surroundeth and goeth," for the wind surrounds and then at length goes on, and to its circuits doth the wind return; there is no sense in explaining it that the whole verse refers to the Sun, and that the word *Ruach* "wind" means "corner," for then it should have said simply *Ha-ruach*, meaning "direction" or "corner," not "*shab Ha-ruach*."

Now the winds depend on the Sun; for when it is South, the south wind is on the increase, and when in the Northern corner, the north wind.

Experts in navigation, acquainted with the origin of winds as coming from the Sun, have found convincing proofs that the Sun goes round and round, as is borne out by Ecclesiastes (i. 5): "The Sun shines forth . . . and hasteth to its place"; thereafter "The wind turneth about continually in its course" (*ibid.*, 6), which means the wind by itself; then comes a reference to the waters: "All the streams flow to the sea . . . thither they go again" (*ibid.*, 7). In these clauses you have three out of the four fundamentals of the earth's composition, namely, fire, water, and wind, the fourth having been referred to before in the words, "the earth abideth for ever" (*ibid.*, 4).

Now these four fundamental elements are mentioned in their respective places, but people pay no attention to the fact.

Already in the Book of Genesis (i. 1-2) "fire" is implied in the expression "heavens" (*Shamayim*, compounded of *Esh* and *Mayim*); "air" is identical with *Ruach* "spirit," used in the creation of heaven and earth, when it says, "The spirit of God was hovering," etc.; then comes "upon the face of the waters." In Job, too, (Ch. xxviii. v. 25, 24): "When he maketh a weight for the wind, and meteth out the waters by measure"; "for He looketh to the end of the earth." "Who hath directed the Spirit of the Lord" (Is. xl. 13)? Then in Proverbs we read: "Who hath ascended up into heaven and descended? Who hath gathered the wind in his fists" (xxx. 4)? "Who hath bound the waters in his garment? Who hath established all the ends of the earth?" And so in Ecclesiastes, as I mentioned: "The Sun riseth," etc. (i. 5).

I have recited these passages to add additional support to the arguments adduced in this work, in which the scientists have applied themselves to speak on the subject of the origin and sources of matter. It is no light theme, since from them are derived all created things and their forms.

QUESTION LIII.

[Bödl. —; Ad. LXII.]

Why does the wind blow round about the habitable parts of the globe more than about the firmament?

Nephew: He who doth not regard thy words has indeed lighted upon evil conditions, inasmuch as deepest lore is revealed unto thee; and it is on this account, in consequence of thy vast knowledge, that my heart is firmly set. Teach me, then, why the wind blows round the habitable parts of the globe more than round the sky; for thou hast spoken in my ears, saying, that the wind moves by reason of its nature and of that similar to it; and if this be the case, it does not move higher than that which its own nature demands. And, therefore, when you say to me that the wind encircles the habitable earth, I ask: Is it fond of separating itself from its place, or does it love it, namely, the earth and water, from which it springs, according to your statement? If it be attached to its original place, why does it separate and rise from the earth at all? And if it is not, why does it not ascend to the skies?

Uncle: If my *Nephew* has come to investigate the nature of the wind to know its course, having applied himself to understand, and to bring relief to himself (for your question shows lack of knowledge concerning the origin of this phenomenon), then all I can say is, that in writing on the subject of winds,

I stated air comes partly from earth, and partly from water; and there is further superadded something of the nature of fire, to produce sound; so that when the characteristic of sound attaches to it, it approaches the fiery element, which is proportionately light, in consequence of all the moisture that abounds in it; whereas the colder elements do not leave it to rise upwards, namely, water and dust. Thus there is (in wind) some characteristics that weigh it down by reason of its "cold" and "dense" moisture, and some lighter element in consequence of its "warmth"; hence, when it has to move about, it is unable to rise through weight of moisture, and it is unable to descend through the lightness of the warmth in it; and thus prevented, it hovers over the face of the waters, and round about the habitable portion of the globe.

QUESTION LIV.

[Bodl. —; ?Ad. LXIII.]

Whence comes the force of the wind to produce sound?

Thy words are longed for by me more than any desirable object; and I place the edge of a sharp sword to guard them, while you inform me concerning the source from whence winds rise, their movements, their shock, and their ceasing. I marvel whence the force of the wind to be able to splinter and break rocks in pieces, and with such great thundering noises.

Uncle: I pity you, indeed, if your stony fence is beaten down by reason of the destructive tempest, and you know not whence the force and power of the wind to overthrow such fences. Understand, therefore, that the force of the wind is derived from its weight and speed, when it has once been bottled up for some long time in the earth and has not found vent for itself, settling there in stillness till there comes the opportunity for its breaking forth. Everything subject to separation ultimately comes forth only by force, when being detained for a length of time, and then, in being released, it makes a thundering noise; whereas if it lodged there for but a short time, it comes forth quietly.

QUESTION LV.

[Introductory to next.]

This is the dialogue between Uncle and Nephew.

The author *Parchon* came near to the right explanation when he dilated on the subject, and gave a popular interpretation in the following form: Vapour, when rising from the earth, does

not come from the rock or hard mountain, nor from dry and arid soil, where there is much traffic, but only from slack spots like ponds and meadows, and from the sides of the earth; for when the sun goes beneath the ground in the night it warms the earth, which is itself like mire. It is on this account that thick vapour rises from it, and the wind brings it to all the corners of the world, becoming like a strong garment, and moves it as a ship is tossed; and from that motion arise sounds and thunder.

I have further heard that, owing to the rains which are in the firmament above the sky formed from the world's atmosphere, when great heat is generated, the lower sky is warmed by the heat, and the rains flow upon it from the sky above it, and make the sound "Tuk, Tuk," as when iron becomes white hot by fire, and water be dropped upon it.

You can know that this is true, since such noises do not come in winter-time, only in summer, and always after intense heat, and near the rain season. Should they occur in winter, it is through the heat owing to the cooling of detached air; but on this point he has expressed no view, only concerning noise and thunder; he has not spoken with regard to the fury of the winds.

I will now return to the dialogue between Scientists, the explanation on the subject given by the Uncle to his Nephew.

QUESTION LVI.

[Bodl. —; Ad. LXIV.]

Whence proceed noise and thunder?

Great as have been the searchings of heart on the part of my Uncle, for his is not fatty and clogged, yet there is a subject which men have not touched upon, and which has also not entered the chambers of their hearts, namely: Whence comes the noise of the thunder? Dost thou know how it comes about that when they have sway over the earth, the people are affrighted at the sound, their hair standing on end; and not human beings alone, but even domestic animals, when they hear it, return to their homes; and as for the wild animals, they stick close to the oak trees; and as for the birds, they avoid the air, and they hide in the forests, and in the thick foliage. There are also objects that find their shelter in some other substance, in the very heart of that substance, so as to do their work. Such are pearls, when they hear the noises before their work is finished; they leave off, and fleeing, hide themselves in the deep sea, and do not return until the noises have ceased. Now canst thou unravel from thine own understanding this problem, and enlighten me on it, being the one person in the world to know it?

Or, dost thou share the views of the rest of the world who know nothing of this thing, the conspiracy (of silence) being so strong and hard, thou being associated with them?

Uncle: Why thus pursue after me? What is the matter that you assemble against me? This has broken the staff of the wise; it is therefore hard to explain to you, unless your heart induces you to believe; but if you will direct your heart to me, you will understand it before you lie down; and as for him who is prepared to meet my views, he will dwell securely, free from worry.

The matter is true beyond doubt, and there need be no palpitation of the heart, that the air which comes from the earth is, by virtue of its natural sweat, raised on high above the earth. This you can verify by observation. There is the fine mist, the thicker vapour mid-way, and still thicker, and then the most dense, in proportion to the quantity of sweat issuing from the ground which produces moisture. To repeat, there is the mist thick as mud; there is the finer; and the thickest of all, which when rising above on to the highest places, is killed by the cold which issues from the atmosphere, the sweat once again becoming cloud.

But if it should happen that the cold air meet the mist, which in reality is sweat, then with the cold wind the air which comes from the sweat would be turned to hard frost; and this frost, coming from the cold, would expand far and wide in the air, and be maintained by the lower atmosphere that keeps it up so that it will not break. Should it, however, happen, either that it meet a strong wind, or in summer-time heat without wind, then the frost would be melted by the strength of the heat or broken by the strong wind; and when the wind reduces it, so that it find no hold, it will then melt, and fall. You can both feel this, and observe it by the eye; for in winter when the noise comes, your ears will tingle when it breaks and splits; and similarly in summer when it melts, your ears will hear it. Then if from such causes thunder and noise arise, be not surprised at the occurrence; for you can observe the clouds with the eye, and by feeling you can distinguish the frost at the time when the wind blows, and it melts when cracking. These things will, therefore, not appear to you so very strange, since you can hear them with your ears. Why then be confused and gnash the teeth, and blink through fear of this, reeling like a drunken man with gaping mouth, when you taste what is unpalatable?

But know, that what has influenced thee is thy ignorance of the origin of things, which has closed thine eye from seeing, and thy heart is too poor to understand—the cause of so many

people stumbling. For the heart enveloped in gross darkness, and not arriving at true perception, is continually groping about like a blind man in the dark, for he does not put faith in the words of the wise, who see things with their mental vision and with their physical eye.

Therefore, look well to the problems concerning the origin of things, so as to understand how they follow their own courses; be no sluggard, unwilling to gain knowledge, deeming it such a heavy burden. I have found many such, who when I spoke to them, paid no heed to my words, nor did they incline the ear, and so my word went forth abroad, mocked at in the world, they talking nonsense in explaining the way of the thunder. And if you wander after them, you will become as one of them.

QUESTION LVII.

[Bodl. —; Ad. LXIV.]

Whence come frost (or hail), called grêle, after thunder?

Nephew: He who listens to thy words will rejoice, but he who mocks at them, trouble will overwhelm him. Correct me then in thy love, but consider me not a nuisance, when I take courage, and apply myself to the acquisition of learning and knowledge, justifying to myself the words which I spake (or, thou didst speak) with regard to *Koheloth* and the origin of air. But as regards the frost coming from the air (as you told me), I cannot understand it, nor come to a decision, as to how the air can carry it; and if it be broken up, as you say, why no big pieces are visible.

Uncle: You have the right on your side, as I was too brief in my explanation. But now I ask you to ponder the way of frost, its original causes and effects. Have you ever seen, after the noise of thunder, the frost called grêle?

Nephew: I have often told you that I have seen it.

Uncle: I have frequently seen frost like crumbs, and man and beast killed in consequence of their dropping from the air. And now do you know the cause of this, and whence come these morsels of frost, called grêle? They come from the numberless clashings of the clouds, when the air coming from the sweat of the earth is broken, and it turns to cloud (becomes cloud), and is turned to ice. And when the portions are crushed and beaten very fine, and they come down upon the earth, which is their destination, if the air near the earth is cool, then the wind cools it, and “scatters the hoar-frost like dust,” as ice called grêle; but if the air be warm, the morsels of ice dissolve, and they turn once again to water, but creatures do not grasp that it is mere water.

Hence it happens that rain or bits of frost, called grêle, come after the noise of the breaking of the ice. Now keep this in mind, and do not be troubled about it; for it is not that small pieces are produced in the sky when you see them falling, and that they return, but that ice was extended overhead, and by the impact of air it is broken into the shapes found on the ground, remaining in that state in proportion to the temperature of the earth.

QUESTION LVIII.

[Bodl. —; Ad. LXV.]

Whence the lightning-flash at the time of thunder?

The lips of the wise scatter knowledge; so I trouble you at intervals, time after time, you whose pleasant words are as honey from the comb; I long that my soul may be revived by them, enjoying this honey of honies. For this reason I beg you to instruct me: Whence comes at the time of thunder the flash of fire, lightning, that lights up the world, and all that are beneath the heavens see sparks of fire escaping? True, I have heard many dilating upon the matter, but their reasons do not hold. And, therefore, I cannot justify their statements.

Uncle: This is a question which has a right to come into the very courts of the wise, and to reach them in the innermost temple of knowledge, namely, confirmation of the origin and nature of the thing that giveth light to the eye of man. At every impact of two objects that rush towards each other, by the very fact of their rushing there issues first as a result of their impact that which is light in their composition, and the light elements inherent in the nature of cloud takes the form of fire, inasmuch as cloud is a combination of the four elemental properties, the lightest of which in every body is the element of fire; it therefore follows, that fire comes forth through the force of the impact of the bodies, and it sheds its light to the corners of the earth. In the tent of the middle atmosphere, the impact of the bodies, *i.e.*, the clouds, strikes the structure of the firmament, and owing to their impact, lightning and a flash of fire are emitted.

QUESTION LIX.

[Bodl. —; Ad. LXVI.]

Whence come fires after thunder, and why do they not fall always?

Nephew: Wherefore does there not come after all thunderstorms the noise that splits with flames reaching to the sky, and

burning and hewing down things, known by the name of *polderon*? Surely several sounds are heard in addition to it. And lest thou shouldst think me a fool, I shall not be silent, so that thou shouldst not gloat over me and say, I have put him off with a reed.

Uncle: You seem to me to be an ambush-man, stabbing as with spears; yet I will not be afraid of thy voice, I will rather reply to you gently, so as to extricate you from the band of fools, causing you to apply your heart to the learning of the wise. There is no noise like that of the thunder called *polderon*.

Noises are divided into three classes, and there is but one of the nature of fire. One divides and cuts everything it meets; the second burns like burning iron; a third breaks like stone. From these three different natures, you will understand how it happens that when bodies meet and come to clash, sometimes it is stone that comes down, sometimes fire, and sometimes air. If bodies meet in which there is nothing but wind, only air issues from them, in which case there is fatal danger, when it descends upon the habited parts. And when it happens that bodies meet fire in those clouds in which there is ice, as we remarked, and the clashing in contact is great, there issues fire from them, which is light in nature; while if the clash is slight and weak through the contact, there issues something of the nature of stone, which Greek scholars term "serlion" (?) (*Adel. Kerauninus*), shaped like the stag and ram, and it breaks the ice.

So explain the wise men. But I, the copyist, say: We find it expressed in Scripture thus: "Out of whose womb came the ice? And the hoary frost of heaven, who hath given it birth?" (*Job. xxxviii. 29*). This is what God spake to Job; and without this utterance, he would not have known it. But in the words of *Elihu*, it is said: "Out of the chamber cometh the storm" (which means the winds); . . . "By the breath of God ice is given" (*Job xxxvii. 9, 10*).

It is not proper for men of humble and obscure rank to multiply words on this point, much or little, from their own ideas; for even in this which I have written, I have gone beyond my knowledge in the attempt to understand the nature of the atmosphere, when it becomes spoilt and repellant. Such is my explanation.

QUESTION LX.

[Bodl. —; Ad. LXVII.]

How do thunder and hail obtain the force to pierce an object? Since you made a beginning with the origin of sounds,

I would gather the following additional information and ask: Whence does there proceed the mighty force which sends forth from the contact of clouds a substance, whether of the nature of fire or air or stone, mingling with the dust a thick atmosphere as it sweeps a long distance, and descends round about the earth, sometimes destroying cedars, throwing down towers, burning houses, and penetrating into the crust of the earth, and there is no one to oppose it?

Uncle: Give me a little respite, and I will tell you, and you may profit by the utterance of my lips. Understand and see that any object which, in meeting another, has the hold upon it, and is able to pierce and break it, does so by virtue of the momentum which it gains in its course more than by any inherent force within it. You see it in fighting, how riders pierce a thick shield with a small lance, one even not tipped with iron. Again, it often happens that the speed of horse and rider is of greater avail in the conflict than any particular strength in them; it is the speed, you see, which counts in favour of the rival, and in proportion to the strength of the thrower. Here you have the reason for your question, why, in consequence of the force of the impact of two bodies, the speed and the flight have the power to pierce, whether it be fire, air, or stone.

QUESTION LXI.

[Bodl. —; Ad. LXVIII.]

Why is not the sound of thunder heard before the light is seen?

Having once applied myself to these matters, I am desirous of knowing them from end to end. When you say that it is due to the impact of two objects that the sound comes first, and that the sound takes the form of fire, and this distribution of fire it is which consumes things before our eyes, you imply that the fire comes after the thunder, since it is only after the crash resulting from the impact that the fire issues forth; then I would say: Why is the fire seen before the crash is heard? How will you account for the theory of cause and effect, when from the contact of objects fire is produced, realising that the sound is only heard after the air has been disturbed?

Uncle: Your heart has spewed out some little folly; your hardship is great through your undigested matter; nevertheless, if you determine the subject for yourself in its right light, you will cause all this vain meditation, resulting from your thoughts, to be overcome; for it is not right to look for the explanation of the cause and reason of things in nature simply in their chance

meeting or force of impact, but as brought about by the force and pressure of the natural laws of sight and hearing. Now, to extricate you from the chance of stumbling, I will make the following comparison; for every one, however hard, should be willing to grasp a subject when presented by comparison. You are standing upon a high and lofty mountain, and see at the foot of the mount a man hewing wood or breaking stone; you see in the twinkling of an eye his hand inclining to cut, whereas the blow only comes a moment later. So is this matter. Thick clouds run between us and the place where the clouds meet, which robs us of the power of hearing it at once, but these are unable to shut out the flash of fire that flashes to our eyes; this, however, is quite a natural thing; for the perception of the eye is keener than that of the ear, although the moment when the flash is seen is the same moment when the thunder takes place. The eye, however, sees things at a distance, whilst the atmosphere conveys the sound to the ear, and its passage is slow, not reaching the ear till after the lapse of a moment.

QUESTION LXII.

[Bodl. —; Ad. LXIX.]

Why has the Moon the lesser dominion?

If I be in thy sight as a boor, and my errors enough to make one shudder, it is because there is not one among men with an open ear, whose protection you can secure; so if I do ask some little foolish question, close your eye, and shatter it like a potter's vessel. See, we have talked about the earth below, and its characteristics; next, it was our duty to ascend in the scale, and speak concerning the air which intervenes between us and the sky, and its natural condition; and now I'll turn and attempt a complete ascent to the heavens, since the subject which is difficult my heart shall open, as I run after thee to listen to thy statements.

Now this question stands forth first: "Why is the moon circumscribed in her rule and in her beauteous light more than the plexus of stars and sun?" Why, in fact, should she not be equal in dominion? On this point I set my thoughts towards thee, and shall be corrected by thee. For I say, the world is made either from something within itself, or out of something that is existing. And if the moon, which is one of the largest creations, began its existence through some matter, why was her complete circle narrowed, considering, too, that she is nearer to us than the sun and stars, which have not grown less in size than what they originally were?

Uncle : Now you have crossed forts and watch-towers, and broken the doors and bolts of intelligence by reason of strength and power; therefore dost thou go forth with a high hand; nevertheless, there are still left horns (of difficulties), these thou canst not break. They are the two questions which you ask: Whether the moon was created out of itself, or out of some other matter. You may select whichever of the two you please; but do pay attention, and see why the moon was created, and do not consider what it was prior to its formation.

I have heard people lamenting and saying, Why is the moon during all the days of her rule (not) complete? meaning, Why is it not a perfect round? We should have thought that it might always be round, and necessarily giving light from its own self, and not from some other object. But it is not so; for its light is entirely derived from the sun above it; and when she gets near the gaze of the sun, and appears to us obliquely, in proportion to its nearness, its light is reduced to a third, fourth, or half. Hence the cause of its reduction in size. You also know that drought and great heat prevail in the world when the sun is in the constellation Cancer, and that the sun rules for 365 days and more; therefore its heat is variable in the longer interval, as you only experience its chief power in Cancer. Had the power of the moon come from herself, we should not have been able to stand it in the world, inasmuch as her rule is renewed month by month.

It is for this reason that the Creator, blessed and exalted be He, who fashioned the moon, did not endow her with force evolved out of herself, but fixed a period for her to renew herself, namely, every month, to be larger or smaller according to her aspect towards the sun, from which she derives her power. As for the sun, his form remaineth, and does not depart. Not so the moon; being in the lower degree, she changes her light according to her distance from the sun. The light of the moon is subject to extraordinary occurrences when it enters upon the earth between the moon and the sun, in the head or tail of the heavenly "Dragon" (*i.e.*, the moon's orbit). You will not see the sun in the day-time; and in the night, when she gets in position over against the sun, the light of the moon will be wanting.

Finis, Finis, Finis, Amen, Selah!

Translation
of
Bodleian MS. (Hebrew).

TRANSLATION OF BODLEIAN HEBREW MS. (2135 Neub.)

Now these are the questions put by a scientist to his uncle, who was a great man of science.

I. (M. xi.)

O, Uncle, my light and honour! I know that counsel and wisdom are in thee to afford me instruction; now, Why do grasses spring up that have not been sown?

O, Nephew, because God Almighty does wonders: He it is who decreed, and things came about, since He doeth all that He wills. He saith and decrees: "Let the earth bring forth grass, herb yielding seed (Gen. i. 11)," and in accordance with this decree, herbs spring forth unsown and without the help of man, some for good, some for ill, nothing to be added to God's decree.

Then why should not other products and objects, by means of which human beings subsist, grow without man's aid?

O, Nephew, understand that it is because of the decree which He pronounced and the curse concerning the first man's sin, when God Almighty exclaimed, "By the sweat of thy brow shalt thou eat bread. . . . Thorns and thistles shall it (the earth) bring forth to thee (Gen. iii. 1, 18)."

It is for this reason that products do not spring up without the help and toil of man.

2. (M. xiii.)

O, Uncle, why do herbs spring forth from the ground in consequence of four bases, seeing that they are cold and moist, warm and dry, corresponding to the conditions in man, derived as he is from fire and water, dust and wind, scientists and philosophers saying, that earth and dust are cold and dry, fire warm and dry, water cold and wet, and air warm and wet?

Now herbs, composed of four bases, how can they spring from the ground which is cold and dry?

O, my Nephew! It is well known to scientists that grasses do come from the four bases, and so does earth come from the four bases, and so fire, and so water, and so wind, all come from

these four bases; but with this understanding, that as regards the dust of the earth, the cold and dry elements preponderate more than in the other of the three bases, since the ground was created cold and dry. It is in proportion to the nature of the earth from which it springs whether it be warmer or colder, or more moist or dry, that determines the kind of herb that springs forth from the ground.

And so the command, "Let the waters bring forth abundantly, etc. (Gen. i. 20)," refers to the rearing of fish; and since they are brought forth from the waters, and since each one is created from the four elements, each of the four creative elements could not by itself bring forth anything and cause it to rise, i.e., either fire or water, dust or wind. Things, therefore, sprout forth and grow from the four bases wherever they exist in larger quantity, each one according to its species.

O, Uncle, you have told me with reference to the production of herb from the ground; but what about the other three elemental sources, fire, water and air, what do they produce and send forth?

O, Nephew! I answered you with regard to waters that they bring forth a living creature, namely, fish, produced in the water; as regards the wind, which is air and cloud, it rears the creature called *Lilith*, which dwells in ruins of houses or cities; and as for fire, it produces the bird called "Salamander"; medical men agree on this point.

3.

(M. xiv.)

Uncle! Why does a tree engrafted with another tree called *ente*, when producing fruit, bring forth fruit of the kind of the tree and not of the graft, the growth of which is from the earth, its roots spreading broad and long? How can the fruit deal so treacherously with its origin as to take its strength from the smaller tree, and not bring forth from the larger root?

O, Nephew: Thou knowest that the branch (?) of a tree, i.e., the root, when cut, will not rise and grow, and the root which produces the sap will only retain as much as is necessary, leaving the rest to the graft, just as the *nephesh* (vital part) of each living being retains what is requisite for it, emitting to the other members what it does not require for itself. The graft, however, with which the tree is engrafted causes it to grow and rise, to bring forth buds and blossoms, producing the growth of fruit; and because the fruit is nearer the graft and further removed from the root, it partakes of the nature and species of that nearest to it, and is removed from the character of that which is distant from it.

The following has reference to beasts and birds:—

4.

(M. xv.)

O, Uncle! Give me to understand why some animals chew the cud?

Nephew, know that there is a difference in the constitution of man and beast on the side of coldness and warmth. Through the heat of the stomach the food is ground until it becomes small; this is the case with oxen and sheep, goat, hart and ram. Therefore medical men call such animals that chew the cud cold by nature, the *Goyim* calling them *melancholic*.

O, Uncle! If the animal chews the cud through cold, why do not such as the horse and ass, which the doctors call cold *melancholic*, chew the cud?

Nephew, it is as you say, that they are cold, only they are warmer in degree than the animals afore-mentioned, viz.: oxen, sheep, goat, hart and ram.

There are, moreover, further evidences of animals not chewing the cud, namely, when they have teeth upper and lower, so that they can grind their food well.

O, Uncle! You said that every cold and dry creature chews the cud; why, then, does not man, of a cold and dry nature, chew the cud, seeing that the doctors call him *melancholic*?

Nephew, there are human beings cold and dry by nature, and yet in spite of this, they are warmer than the animals mentioned above. But you sometimes see people who, through an excess of cold in their stomach, do not masticate their food, so that it comes back into their mouths, and they spew it out. It is because man has the knowledge to recoil from the food which he has once swallowed, that he spews it forth.

5.

(M. xvi.)

O, Uncle, inform me why animals that chew the cud, when lying down, crouch on their hinder parts and hind legs?

It is, Nephew, because all animals have the most part of their fat on the side of the heart and downwards, like the ox, and such as are cold and dry; and the liver it is which weighs it to one side, and through its weight it lies on the side of the liver, which is rearwards.

But, Uncle, if such animals as mentioned lie down on their rear on account of the weight of the fat, why do they not rise on their fore-part, which is the easier for kneeling, for in the case of animals, "as they lie down, so should they rise up."

O, Nephew, know that all animals that have fat chew the cud, and the cold fat weighs them down; and because they have fat particularly thick, and loins strong, and because of this being

fixed, they lie on the side which is behind the liver, and their stomach becomes warmed from the cold which had weighted it down; thereupon, in consequence of its extra warmth, it is more easily strengthened.

6. (M. xvii.)

Uncle! Why are the habits of some animals different from other domestic and wild animals? I mean, all of the latter drink and urinate, while every winged-bird drinks and yet does not urinate.

Know, my nephew, that all domestic and wild animals are reared on milk, and the milk is derived from the juice of plants and the moisture in foods; the milk forms material for urine, water poured out upon the ground, and produces sap in the passage of the bladder. Having once formed this material, the aperture is no longer stopped up.

Now, the bird does not have milk to begin its nurture, nor does its growth come from such things as have moisture, but from small stones or grain; and when the stone or produce comes at first into its interior, it closes up the place (*or* cavity) of the water, and the moisture within it does not reach the closed place. By reason of the sap, the feather grows, and the sap enters into the growth of the feather. You will know and understand this by squeezing one of their feathers, for you will find moisture in the hole of the feather in which the feather grows, and the sap will issue forth as the feather grows.

7. (M. xvii.—contd.)

O, Uncle! Why have some birds stomachs, called *gois*, and others gizzards, called *gésier*?

Understand, Nephew, that no birds reared from the earth have a stomach, for it would be of no use to them, but they have a gizzard, which is stronger and harder than a stomach; for the gizzard is made to grind small every hard thing, being as it is full of sinews from without and within, and muscle between the inner and outer sinews. It is exceedingly strong, and therefore crushes everything that enters it. But the stomach has no such strength; it is only able to grind fine food.

8. (M. xviii.)

Uncle, why do some animals and birds see in the night, while others do not?

Thou knowest, Nephew, that the eye has four skins (films),

in which are found three substances: moisture from which proceeds sight, called "specks" (*nubecula*); the first is white, by means of which sight is distributed, and it is all sight; the second, upon which sight is concentrated, so that it shall not be dispersed, which is not as white as the first.

[Something wanting in my copy—added by the copyist.]

9. (M. xviii.—cont.)

Uncle! How comes it that the white of the eye changes to yellow? We should not be surprised if it changed to red, since when there is too much blood, it goes to the eye.

Know, Nephew, that the liver is the fount and source of the blood; and the red gall attached to it draws the moisture and the waste from the blood of the liver. Now if the gall be too full, or it be poured into the liver, and some of the fluid becomes mixed, and spreads and disperses through the whole body and in the eye, then the white of the eye appears yellow, because the organs are weakened through the change in the blood. Hence King Solomon's words: "Thou art beautiful; thou hast doves' eyes." (Song of Songs iv. 1), for you can judge from the eyes as to the health of the body.

10. (M. xx.)

O, Uncle! To me it seems a great wonder, as to why the beast has an advantage over man; for beasts have instruments of defence fixed to their frame, while man has not, or they have means of flight. See! the ox has horns, which is its instrument of warfare; bears have tusks, which are theirs; the lion has claws wherewith to fight; in like manner many other animals have various means of protecting themselves; rams, conies and hares, *e.g.*, and many others have nimble feet, which enable them to escape from their pursuers. Man, however, has none of them.

Understand, Nephew, that the Creator has given man an advantage, inasmuch as He has planted in his heart the instinct of device and prudence, and faculties of counsel, to catch all such animals by his designs, to seek out instruments of defence in warfare, or to search for peace with his foes, to allow good understanding to supervene, and to take sweet counsel together. But animals being devoid of the powers of speech have need of weapons for flight and defence.

Now, if man had such weapons attached to his body, he would despair on seeing that in peace-time there was no opportunity for using them. Again, if men were fleet as the stag, man would set his mind and be bent upon becoming a wild person,

and he would pay no attention to become a man of intelligence, capable of appraising knowledge and understanding his Creator, while his thighs and legs and the members of his frame generally would take the place of weapons through their racing; and if the despoiler or war itself should come upon him suddenly, he would not be able to rise and stand up and bear arms in the fight, when it is needed. Therefore God has created man upon this plan, so that he be quiet and at ease when peace reigns, and yet able to equip himself when the time of war demands it.

11.

(M. xxi.)

O, Uncle, it is hidden from me why a man of ability forgets, and a fool remembers things.

Understand, Nephew, that the heart, more than any of the other organs of the body, receives the whole power of thought and of the soul, and therefore all the members of the human frame are subservient to it. There are parts in the body which contain cords emanating from the brain to the eyes and ears, and all of which serve the brain and heart; in this way, that one comes from the brain, a second from the heart, and the third from the remaining members. In the brain there are four compartments; the first about the forehead, which is the store-house for faces; then the store-house of feeling; then that of memory; and lastly that of touch. The brain is, as it were, a spring to water the whole body, by means of the spinal cord which comes forth from it, similar to a stream which comes forth from a spring. All the chambers have marrow in them like to its original source; in the forehead there are two cavities in which are concentrated the faculty of perception, and from whence starts the thinking power.

I would now explain to you that understanding proceeds from "the form." When a man sees a person or a horse or an animal or any other object, it is by means of the store-chamber of faces that he comes to understand whether it be a man or beast or some other thing, and what its name is; whereas if this chamber be damaged by a knock or wound or any such accident, he may observe, but he will not recognise, the object.

All this knowledge comes from the moisture in the marrow of the respective compartments; and of all that he observes and recognises he forms a clear judgment by means of sight, and he distinguishes what he observes, and subjects the store-chamber of sense to judgment and feeling for the benefit of his body.

Now if the chamber of sense be hurt, the patient could not feel or perceive anything, and would be like the beast.

Whatever a man has judgment upon, the store-chamber of feeling gives it practical effect by virtue of the chamber of recol-

lection, in which memory resides, and sets a seal upon all that the man's eyes see and his ears hear, observing in order to recognise, and to form a judgment, by means of the other store-chambers. Now this particular marrow is drier than that of the others, so that whoever possesses dry marrow will have a retentive memory, while he will not have cleverness, for the latter proceeds from the moist marrow of the brain.

12.

(M. xxiii.)

Uncle! Why is the nose above the mouth; it is, indeed, objectionable that the mucus of man should run down upon his mouth?

Because, Nephew, there is heat in the marrow of the head, and mucus flows down from the marrow, the nose is placed near it to bring down the mucus from the right and left by means of two apertures in it, lest the nauseous part which comes down from the marrow in the head descend into the mouth. And since the mouth is on one side of the body, and there is no opening from the body (upwards) to the mouth, the mouth is placed near the stomach of the body, to bring down and spew out the mucus of the stomach.

13.

(M. xxiv.)

Uncle! Why does the hair of a man fall off in front and not from the back?

Nothing, Nephew, enters the stomach of man's body but through the mouth. The food in the stomach is ground and cooked as in a kettle upon the fire; the smoke then ascends upwards into the head through the openings, this way being the shortest cut to a man's face, and furthest from the back of his head. Know, too, that in the stomach, which boils like a kettle, the pores spread and widen, and through it steam passes with the moisture, so that the hair is unable to stand the smoke that rises through the widening of these pores or apertures. It is for this reason that it happens that young men who are over-heated become bald, the hair being unable to obtain a hold in them in consequence of the smoke and heat that rise to the head through the width of the pores.

14.

(M. xxv.)

Uncle! What is the nature of sound that comes from man?

Know, Nephew, that the voice or sound that comes forth just as the soul (*Neshamah*), is simply air, as you observe in the case

of any instrument. Furthermore, the air existing in man's mouth, and expelled outwards by the tongue and throat, is simply air coming out.

15.

(M. xxvi.)

Uncle! Why can you not look through an iron, copper, or stone wall, seeing that the power of the eye is greater than that of the ear, and man is able to see at a distance that which he cannot hear?

Understand, Nephew, that sound, which is air, passes through pores which are not visible.

Then, Uncle, why has not the eye the power to see through such apertures, as the ear has the power to hear through them?

Because, Nephew, gloom and darkness are enemies to the eye, and the eye has power to see the wall, as the light of the sun shines upon it; but it cannot see through the wall: this the eye is unable to accomplish.

16.

(M. xxvii.)

Uncle! Teach me concerning eye-sight; why does the eye see?

Know, Nephew, that in the brain there is a very rare air created from the species of fire, which comes down through the two nerves that proceed from the brain to the apertures of the eyes, and these are called organisms; no ending of them appears in the whole forehead and its surroundings, all being hard, with the exception of these two openings, which are exceedingly delicate. From these come sight, which is also called an organ. Furthermore, the eye is composed of the four basic elements, though the fiery exist in it to a greater degree than the other three. Now as to why when the eye be closed, sight does not altogether disappear, you must know that whenever any object rests, it gains strength through resting; and so the air from which sight proceeds, when it stops looking hither and thither, is by that very cessation strengthened in character when once again the eye opens.

17.

(Cf. M. xxxi.)

Uncle! Why does man see his face in glass?

Know, Nephew, that gloom and darkness are enemies to the eye; hence pure sight is on the side of the eye, and darkness on the other side. The eyesight extends as far as the darkness, no further, and it then returns to the eye, reporting what it has seen. But the glass which is clear on both sides arrests the object seen, and does not bring it back to the eye.

18.

(M. xxxii.)

Uncle! How is it that a man, standing in the light, is not seen well by one standing in the dark, while they standing in the dark see well those standing in the light?

Dost thou not know, Nephew, that light and darkness are foes, and that when the eye gazes at the darkness it finds no support, and wanders from its path. But when the eyes look at the light, from which they are derived, since sight is from the *Neshamah* (soul) in the brain, which is the light of life, they rejoice in their fellow-creation, and the same when they gaze at the stars, which are equally of the same nature, since they are of one and the same creation.

19.

(M. xxxiii.)

Uncle! Why are the eyes in front, and not at the back of the head?

Thou knowest, Nephew, that the brain consists of three parts, and that whatever the eye sees it reports to the *Neshamah* which is in the brain, by means of nerves. The first chamber is that of observation, storing that what the eye sees; the second subjects it to the judgment of sense; and the third commits all to memory, and puts the seal on it. If, however, the eyes were at the back of the head, remembrance would depart.

20.

(M. xxxiv.)

Uncle! Why is the nostril the organ of smell, the palate that of taste, and the hand the organ of touch, so that one is not able to do the work of the other.

Because, Nephew, it has been so ordained that each should but do its own work. The nostril will not smell, unless it finds some external object to smell, whether it be bitter or sweet, a perfume or apple, or something nasty, since smell comes from the atmosphere existing without, which atmosphere reaches to the nostrils, and they therefore perceive the smell. Now the nose is planned by creation for smelling, for the nose has length, and it runs to the brain, in which lies the *Neshamah*.

The same applies to the things which come from the brain to the palate and tongue, and to the hand called "the instrument of touch"; the hand is able to distinguish between cold and wet, and warmth and dryness; the palate and tongue taste through the nerves of the brain, wherein the *Neshamah* resides.

21.

(M. xxxv.)

Uncle! When the heart of man would be glad, why do tears

flow from his eyes when he has some joy, and whence comes weeping?

Know, Nephew, that gladness broadens man's heart, and it brings forth, begets, and generates in a brief period of time warmth, and that warmth is of varied character; and for the time being its steam and moisture ascend to the brain, and being moist they drop from the brain to the porous openings in the head, and along that way water descends into his eyes, and his eyes drop tears.

22.

(M. xxxvi.)

Why, O Uncle, does both warm and cold air come out of man's mouth?

Understand, Nephew, that wind from the air goes in and out of the body round about the heart; and from the heart it goes to the veins which pulsate like the billows of the sea, and the soul thrusts off the heat, and draws the cool air from it. Hence when you press the pulse, it is found that the wind which has already entered the body, and leaves the body immediately through the mouth, is very warm; and that wind which man draws from the air into the mouth, and breathes out before it enters the body, is cold, as you see in the article named a bellows (*soufflet*), with which they blow the fire.

23.

(M. xxxviii.)

Uncle, how is it that the body can stand hot food more than the mouth?

O, Nephew, thou knowest that all the members nearest the heart are warmer than those further away. Now the throat is nearer to the heart than the mouth; hence in degree it is warmer, while the mouth and tongue are colder, they being further away from the heart. When, therefore, the mouth and tongue taste food which is hotter than is right, they cannot bear it; but as soon as it enters the passage of the throat, which is warm, it is able to bear it. You can see it yourself in the fact that if your hand is warm, you cannot touch even cold things, and if your hand be cold, and it touch something too hot, it cannot bear it.

24.

(M. xl.)

Uncle, why does not the new-born child walk at once, like domestic and wild animals which, immediately at birth, walk on their feet?

See, Nephew, man's frame is much more delicate than that of the animal, it having been planned so by Creation that man should walk with upright posture, looking heavenward, inasmuch as he was created out of the Spirit of the Creator, and the Soul is desirous of understanding her Creator.

The life of the animal, on the other hand, descends downward towards earth, and therefore the Creator created it with big limbs, each one according to its burden, designed to serve and minister unto man; hence his large and hardy frame.

25.

(M. xli.)

Uncle! Why is a child first reared on his mother's milk; it seems an unclean method?

Thou knowest, Nephew, that the birth of man is from the blood of the woman, and that after he comes forth to the open, the blood of the woman turns to milk. He, therefore, thrives upon his mother's milk, which is of his own being. So also do animals suckle their young. Now, why is this milk not good for youths and men of age, seeing that milk is the earliest diet of man's upbringing in consequence of its being quickly digested? For this reason, that one article is necessary for tender children, another for youths, the members of whose frame are developed, and another for older ones of stronger constitution, who require nutritious food, so that they shall be able to do hard work.

26.

(M. xlii.)

Uncle! Why does a healthy man become infected when he lies with a woman with whom a diseased person had been lying, whilst the woman herself with whom this diseased one had been lying, is immune from infection?

Understand, Nephew, that man's nature is warm and dry, the woman's cold and wet. Therefore when the woman, in her nature, receives the seed of the infected one, warm and dry, the cold and wet nature of the woman expels his disease, and does not give that seed a chance of destroying her natural endowments, for no cold and wet thing can attract to it the warm and dry, while the semen once sown does not lose its character and force. Now, when a healthy man comes upon her, it happens that he draws unto himself the infection through the dry and warm in himself and that of the infected one which was warm and dry, similar then to his own endowments; for the warm and dry attract the warm and dry, being of one and the same nature, while the cold and wet repel their opposites, not being of the same nature.

27.

(M. xliii.)

Uncle! Why does the female, though cold by nature, long for the male, seeing that men have their desires owing to their excessive heat?

In consequence, Nephew, of her cold nature the female longs for warmth, while male longs for the opposite, *i.e.*, to cool his exuberant warmth; the moisture in woman and the menstrum, cannot, owing to her coldness, be oxidised within her in the same way as it is in men who are warm. The blood, therefore, longs to come forth, and of a necessity it does come forth as the natural effect of coition, although it happens that when a man, tainted by contact with a woman with whom one diseased had lain, copulates with that woman, she does not draw to herself the infection, unless under three conditions, *viz.* : that she gives birth to children from the infected one, or she draws to herself the breath that comes from the mouth of the diseased one, or that the woman becomes extraordinarily heated through copulation.

28.

(M. xliv.)

Uncle! Why does man part from life and die?

My question does not refer to those killed or drowned, for this naturally follows.

Nephew! The soul in the body is created by the Almighty; it, therefore, longs for the rule of proportion found in the human body created from the four bases—fire, water, dust, and wind. Now, as long as the soul is in the body, and these four elemental properties exist in the right corresponding proportion, warmth against cold, and moisture against dryness, one not preponderating over the other, or as long as these four creative agencies are fairly nearly balanced, the soul is rejoiced and finds pleasure in her (the body), so that body and soul become like two staunch friends. But when one of these elementals preponderate over the other three or over two, and they come into conflict with one another, so that one of them gets reduced, the soul then is unable to remain in the body for even an hour. If one of the four becomes so low as to be wanting, the soul quits the body without delay, just as a man flees from before his enemy.

29.

(M. xlv.)

Uncle, why does a man, once satiated, become hungry in a short time?

Man, dear Nephew, is created out of four basic elements, and the cold is compounded with the heat, and the moist with the dry. When these are well mixed, one corresponding to the other,

man is in good health, his food is easily digested according to the right way, and his whole frame and its members are nourished.

But when heat, which is fire, prevails in the body over the other three, the food is instantaneously masticated and digested, and after a short time, owing to the heat of the fire in him, he becomes hungry, because the food which was masticated did not nourish the members properly, and in the same manner as at first; hence he becomes a victim of sickness.

30.

(M. xlvi.)

Uncle! Why does the living one fear the dead, whom he loved as his own self, and as soon as he dies, his love for him vanishes forthwith?

Understand, Nephew, that the living love everything that maintains its character, and hate that which loses its original pattern and usefulness in the world. So it is with the living condition called the association of body and soul. It necessarily follows that the living one loves this association; and once having loved it, it hates the dissolution. Now, after the soul has divorced her, why should she live in the body, which she hates and fears?

But it is only the veriest fool who will think anything of such hate as this.

31.

(M. i.)

Why, Uncle, when a man falls into the water, does he go down into the depths of the water, while when dead he floats on the surface of the water, and you know that a man dead is heavier than one alive?

Understand, Nephew, that man is created out of four elements—fire, water, dust, and wind. The fiery creative agency, warm and dry, is enclosed in the red gall, and its nature is to rise upward; now when the gall is opened, man dies, for the creative agency of air and fire depart from him, and the dust and water portions descend downwards; consequently, the dead are heavier than the living. According to my idea, it is because the body being hollow, it floats upon the face of the waters.

32.

(M. v.)

Uncle! Why are the waters of the sea more salt than other water?

Because, Nephew, the sea is great and wide, and receives the force of the sun's light, and that of the satellites and all the heavenly hosts. On account of its width, it receives all the heat from the sun that shines upon it; and through the sun's heat, the

waters are turned and become thick, receiving the taste of salt. Now, if you enquire of the peoples inhabiting near the sea, they will tell you that, without human effort, they have found the waters left upon the rocks turned salt, owing to the spot being opposite the glare of the sun; while, on enquiring of those removed from that spot, and not opposite the heat of the heavenly hosts, you will learn that they do not have salt ready for them in this manner, by the force of fire or great conflagration. You will see, too, that salt may be derived from sweet water by means of heat and fire.

33.

(M. vii.)

Uncle! Why do all streams go to the sea, and yet the sea is not full, for one cannot estimate the sum total of the rivers?

You should know, Nephew, that just as some rivers go to the sea, in like manner it may be said that some of them derive birth from the sea; as it swallows up, so it gives forth; the waters are carried along under the earth, and are swallowed up by it, and it is in the nature of the sea to restore what is in it; this is the sea's vitality.

34.

(M. viii.)

You say, Uncle, that the streams return from the sea, and no trace of salt is discernible in them; it is found in them when they are mixed together; going to the sea sweet, they return sweet.

Do not be surprised, Nephew, for the waters are carried along in the earth's clay, in the lap of the earth, which is not salt; and what they receive of the waters drops from them in the course of their difficult passage; the salt and the clods sink; and being kept back are refined, so as to return to their original sweetness; but if they pass through earth which is salt or turbid, they remain so. You should know that when Alexander crossed the Great Sea, Aristotle, his teacher, bade him carry with him sand from a land not salt, and he placed a big mound on a vessel, and made a sort of well in the sand; and it came to pass that when they were short of drink, and could not drink of the sea-water, for it was salt, they took of the sea-water and cast it into that well of sand, and it came out sweet.

35.

(M. —.)

Uncle! Why are headaches or other bodily ailments more apparent in the urine than in the excrements, knowing that meat and drink enter the body by way of the gullet?

You know, Nephew, that the excrements are the waste of the food that enters the intestines, the remainder being converted into blood; and that blood nourishes all the members, each according to its importance—the heart, the brain, the liver, the red gall, the millet, the kidneys, the sinews, and the fats—by means of small nerves; all the water separated from the other blood, from which the organs derive their nourishment, going down to the bladder, and entering it; it retains that water; and this it is which is turned into urine.

36.

(M.—.)

Why, Uncle, does the vein of the pulse beat more than the other veins, which do not pulsate; and why do we learn from the pulse whether a person is hot or cold, wet or dry?

Know, Nephew, that when the Almighty created man, and breathed within him the breath of the spirit of life, that spirit being warm and moist, surrounding the heart, sustaining and strengthening it, coursing through the veins that beat, and as it enters the veins, so going forth to the heart, and thence coming out again by way of the mouth—this is breath. Now, since this is very warm, it must necessarily come out, so as to introduce another breath, colder than itself, coming and going like the waves of the sea. In these veins that pulsate, there is no blood as in the other veins, but there is a vein full of the spirit of life surrounding the heart; and physicians can tell, when they feel the pulse, the force and strength of the heart, and whether it has warmth or cold, moisture or dryness.

Finis.



Translation
of
Adelard^{us} of Bath's
"Quaestiones naturales" (Latin).

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QUESTIONS."

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ADELARD OF BATH'S PREFACE
TO HIS
VERY DIFFICULT NATURAL QUESTIONS.

On my return the other day to England, in the reign of Henry, son of William,—it was he who had long maintained me abroad for the purpose of study—the renewal of intercourse with my friends gave me both pleasure and benefit.

After the first natural enquiries about my own health and that of my friends, my particular desire was to learn all I could about the manners and customs of my own country. Making this then the object of my enquiry, I learnt that its chief men were violent, its magistrates wine-lovers, its judges mercenary; that patrons were fickle, private men sycophants, those who made promises deceitful, friends full of jealousy, and almost all men self-seekers: this realised, the only resource, I said to myself, is to withdraw my thoughts from all misery.

Thereupon my friends said to me, "What do you think of doing, since you neither wish to adopt this moral depravity yourself, nor can you prevent it?" My reply was to "to give myself up to oblivion, since oblivion is the only cure for evils that cannot be remedied; for he who gives heed to that which he hates in some sort endures that which he does not love." Thus we argued that matter together, and then as we still had time left for talking, a certain nephew of mine, who had come along with the others, rather adding to the tangle than unravelling it, urged me to publish something fresh in the way of Arabian learning. As the rest agreed with him, I took in hand the treatise which follows: of its profitableness to its readers I am assured, but am doubtful whether it will give them pleasure. The present generation has this ingrained weakness, that it thinks that nothing discovered by the moderns is worthy to be received—the result of this is that if I wanted to publish anything of my own invention I should attribute it to someone else, and say, "Someone else said this, not I." Therefore (that I may not wholly be robbed of a hearing) it was a certain great man that discovered all my ideas, not I. But of this enough.

Since I have yielded to the request of my friends so far as to write something, it remains for you to give your judgment as to its correctness. About this point I would that I felt less anxiety, for there is no essay in the liberal arts, no matter how well handled, to which you could not give a wider range. Grant me, therefore, your sympathy. I shall now proceed to give short answers to questions put by my nephew.

Here begins Adelard's treatise to his Nephew.

You will remember, Nephew, how seven years ago when you were almost a child in the learning of the French, and I sent you along with the rest of my hearers to study with a man of high reputation, it was agreed between us that I should devote myself to the best of my ability to the study of Arabic, while you on your part were to acquire the inconsistencies of French ideas.

NEPHEW: I remember, and all the more because, when departing, you bound me under a solemn promise to be a diligent student of philosophy.

The result was that I applied myself with great diligence to this study. Whether what I have said is correct, the present occasion will give you an opportunity of discovering; since when you have often set them forth, I, as hearer only, have marked the opinions of the Saracens, and many of them seem to me quite absurd; I shall, therefore, for a time cease to exercise this patience, and when you utter these views, shall attack them where it seems good to me to do so.

To me it seems that you go too far in your praise of the Arabs, and show prejudice in your disparagement of the learning of our philosophers. Our reward will be that you will have gained some fruit of your toil; if you give good answers, and I make a good showing as your opponent, you will see that my promise has been well kept.

ADELARD: You perhaps take a little more on you than you ought; but as this arrangement will be profitable not only to you but to many others, I will pardon your forwardness, making however this one stipulation, that when I adduce something unfamiliar, people are to think not that I am putting forward an idea of my own, but am giving the views of the Arabs. If anything I say displeases the less educated, I do not want them to be displeased with me also: I know too well what is the fate which attends upon the teachers of the truth with the common herd, and consequently shall plead the case of the Arabs, not my own.

NEPHEW: Let it be as you will, provided nothing causes you to hold your peace.

ADELARD: I think then that we should begin with lighter matters, and if here I fail to give you a reasonable account, you will know what to expect in more important subjects. Let us begin then at the bottom, and so proceed upwards.

CHAPTER I.

WHY DO PLANTS GROW WITHOUT ANY PREVIOUS SOWING OF SEED?

NEPHEW: Since you distrust yourself, I see that you want to sharpen your wits by dealing with smaller matters. I will therefore make the start of our disquisition with plants which have their roots in the earth. I ask, then, how do plants spring from the earth? What reason exists or can be given, seeing that the surface of the earth is at first level and motionless, what is it, I say, that stirs there, springs up, grows, and puts forth branches? For though, if you like, you can collect quite dry soil, and after carefully riddling it put it in a pot of earth or brass, yet as time goes on you will see a shoot springing up, and to what are you to ascribe this save to the wondrous effect of the wondrous Divine Will?

ADELARD: Will on the part of the Creator there certainly is in the springing of plants from the earth, but it is not divorced from reason. That this may be quite clear, I grant that plants spring from the earth, but not from pure soil: it is assuredly a mixture of such a sort as to contain in each of its particles, which indeed are subjacent to sense, all four elements with their qualities. Most certainly these four samples compose the one substance of the universe in such a way that the component parts exist in each compound, but yet never in such a way as to be apparent to the senses. The fact is, that we mistakenly call the compound by the name of its simple, for no one has ever touched earth or water, just as no one has ever seen air or fire. The things which we apprehend by our senses are compounds,—not themselves, but made out of themselves. Hence as the philosopher says, we ought to use not the terms earth, water, air, fire, but instead earthy, watery, airy, fiery. Therefore since in your earthy matter, no matter how subtly pulverised, the four causes necessarily exist, there arises hence a sort of compound, mostly earthy, to a less extent watery, less still airy, and least of all fiery: it owes to earth its power of cohesion, to water that of spreading, to air and fire the tendency to rise, for unless fire were contained in it, it would have no power of upward movement, and unless water or air, no power of lateral expansion: while finally, were it not for earth, it would have no coherence.

Hence it is that the things combined with wondrous subtlety in your dust, come forth into the light. However, that you may understand the matter with entire clearness, I place the cause of this process in the exterior elements arousing and drawing forth their like, and by their qualities driving it out: hence the inferiors,

by a perpetual process of dissolution, pass over to their likes. Your first question is now answered : please proceed to your next point.

CHAPTER II.

WHY ARE SOME PLANTS CALLED WARM, WHEN ALL ARE MORE EARTHY THAN FIERY?

NEPHEW : No doubt the man with a mere smattering of philosophy but no thorough training in it, will regard your answer as satisfactory, but not so I; nor will you thus escape my net. I grant that plants spring up because some cause drives them forth, and put to you next the following question. Since all roots of this sort are rather earthy than fiery—that is, share in earth rather than in fire, for it is on that account that they have both birth and position in proximity to earth—why are some of them found to be warm by nature, and others cold? For inasmuch as the greater part of them is earth, it follows that the property of earth abounds the more in them. Consequently they should all be called cold rather than hot. If, therefore, as you explained just now, they have derived both their name and property from that which abounds most in these compounds, then all things which are nourished from the earth and in proximity to it, should rather be called earthy and cold.

ADELARD : I cannot deny that their nature is earthy, rather than fiery, for they have a greater share in earth than in fire. But when we come to your inference that being more earthy they are, therefore, less fiery, I part company with you. For the words "more" and "less" are in regard to the qualities of things used in two distinct senses—one, according to *quantity*, two, according to *efficient power*. For instance, this cloak of mine is entirely green; so also is the emerald green. But the greenness of the cloak is greater in respect of quantity, that of the emerald greater in respect of efficient power: hence if you consider quantity, you can say that the former is greener than the latter, but if efficiency, then it is the other way about. Hence in the matter of qualities "more" or "less" according to quantity depends on nature, but this is by no means so in regard to efficient power. In this way, therefore, all plants (since they have a greater share of earth quantitatively) are cold, yet some of them are warm in respect of great efficient power.

CHAPTER III.

WHY DO PLANTS OF OPPOSITE NATURES GROW IN THE SAME SOIL?

NEPHEW : The distinction you draw is not quite correct. Granting that roots are of opposite natures (for some are hot,

others cold), I proceed to ask you, how is it that they live in the same soil. For as everything of the sort obtains its nutriment from the soil, which the Greeks and Romans call "the mother of bodies" (and it is admitted that each several thing is nourished by its like, and destroyed by its contrary), tell me, if you can, how plants of opposite nature can live in the same place, or else grant that they are all of the same nature—but that is impossible.

ADELARD : To test the edge of your intellect, I will protect myself with a shift, and say that plants derive no nourishment from the soil.

NEPHEW : It is easy enough for me to prove the contrary, for when they are plucked from it, they lose not only strength and power of growth, but life itself. Hence it is clear that they have received something from their mother, and when they are deprived of it, die immediately. Again, if they got nothing from it, in vain would be all the diligence of the farmer in working the land. There then is your shift exposed for you, and now you must bring forth a stronger argument if you have one.

ADELARD : Very good : I grant then that they are nourished from the earth, but from a compound not a simple earth—not, that is, from the earth but from the earthy, as I explained before. There being in this the four elements, each plant has food to suck in for itself, the hot plant taking that which is hot; the cold that which is cold; the dry what is dry; and the moist what is moist. You can see this clearly from the fact, that when the outer air robs them by means of the parching summer-heat of whatever they had drawn from the earth, that part of the plant which is above the earth's surface, perishes entirely, while that part which is within the bosom of the earth, its mother, remains protected like a nursing child, and so is kept alive. But wordiness is the mother of weariness : therefore let us go to the next point.

CHAPTER IV.

WHY DO NOT PLANTS SPRING FROM WATER, AIR, OR FIRE, AS THEY DO FROM THE EARTH?

NEPHEW : But you will not go on quite so easily as you think. You have yourself been weaving the halter for your own destruction. If, as you say, the four elements are present in the various corporeal compounds that they may afford nourishment to other compounds also, it follows that the air which we see would be able to give plants the same nourishment, and therefore, when uprooted from the earth, they would draw food from the air. But since, in spite of all their longing for it, the air cannot give

them this, your whole argument goes to pieces, and the accomplishment of everything must be ascribed to God.

ADELARD: I will detract nothing from God; for whatever is, is from Him, and by Him; yet not even this is said vaguely and without due care, as we must listen to the very limits of human knowledge: only where this utterly breaks down, should we refer things to God. Let us, therefore, as not yet being bankrupt in knowledge, return to reason. Air, like earth, certainly contains in itself the four formative elements; yet it neither can nor ought to give food to an uprooted plant. Why I will explain to you. Every object of perception—I mean by the phrase the universe—even though it is the conjoint result of those causal principles, does not contain the various components equally in the compound, e.g., in this body earth abounds, in that one water preponderates: this one has a greater share of air, that one is aflame with fire. Accordingly, therefore, as each one has the greater share of this or that cause, so it follows also the properties of that particular cause, showing this by its special qualities. Notice especially that plants have a greater share in earthy nature, and are therefore also more particularly fed by earth. If they are uprooted, they find indeed nutriment in air, but not the right sort; for of that which is more essential they get a smaller proportion, of that which is less essential too much. Hence their dissolution is inevitable, and for the following reason: their earthy part, not finding sufficient sustenance in the air, insists on being freed from the conjunction in order that it may return to its like—I mean, earth. When this, therefore, is removed, the other components being freed from their weight return to their own kinships. This dissolution the mass of people, who never have true terms at their command, call “death,” whereas it should really be called not death, but “change.” Speaking of the universe, a philosopher says, “Nothing of it is lost, nor can anything be added to the sum total of its contents, bound together as they are; but by the corruption of its parts as they grow old, it suffers a sort of loss.” To my mind, indeed, nothing at all in this world of perception dies; and this is just as true at the present time as on the day of creation. For if any part is freed from any one conjunction, it does not perish, but passes on to union with something else. Let us now, however, return to the main point. My explanation of the question is as follows: by just as much as water differs from earth, by so much does it afford less nourishment to roots, I mean than earth does; of course, it gives more nourishment than air. In like manner, air gives less nourishment than water, but more than fire. But we have taken too long over this matter, which must be obvious to a purblind man or a barber; so let us pass on to something higher.

CHAPTER V.

DO CREATURES OF AIRY NATURE LIVE IN AIR, AND OF FIERY NATURE
IN FIRE, JUST AS CREATURES OF EARTHY NATURE
DO IN EARTH?

NEPHEW: In very truth, it is obvious to the purblind or the sightless. How grievously did the Saracens befool you with their subtle trifling. But not to-day shall you trick me out of laying bare your deceitful and obscure arguments, covered up though they be with subtle falsity: I can see clearly what you are aiming at.

ADELARD: You are putting a question which is unintelligible to both of us, to the end that I may out of disgust grant you what is false.

NEPHEW: You do not know to whom you are talking, but this will teach you. By your own proposition you are forced to admit, that in water certain objects exist which are of a nature more watery than earthy or airy or fiery, and in air certain others which are more airy than earthy or watery or fiery, and others in fire more fiery than earthy or watery or airy; for this is the natural consequence of what you said before. But it will not do, and so you ought to go no further.

ADELARD: Of a truth your *reductio ad absurdum* breaks down altogether: what you have stated is exactly true: in water there are things of watery nature, i.e., fishes, which are mere compacted water; and in air, airy powers. In fire also, that is in the upper ether, there live fiery animals which we can see. Therefore my argument will do, and we are agreed.

NEPHEW: Well, for my part let the argument rest a while. So as not to excite your anger, I will say no more on this.

ADELARD: It is then established how roots grow, and why they are called warm and live, and why they last longer in earth than elsewhere, and why they die.

CHAPTER VI.

WHY THE FRUIT FOLLOWS NOT (!) THE NATURE OF THE GRAFT.

NEPHEW: Let us now pass on to the natures of trees. I ask you then why it is that when a cutting is grafted on a stock, the fruit follows entirely the nature of the thing grafted. It is agreed that the graft and the stock are of different nature, and, as I have said, these things when growing get their nourishment from the ground: consequently, they will draw from it either the same nourishment or else unlike and opposite nourishments. But



to live on the same food is impossible for them, since they are of different and opposed natures; so that the graft requires food from the stock. Now this it draws either through the stock or otherwise: but the latter course is impossible. Consequently then it draws it through the stock. Again, the stock either draws the same food or does not. If it does not do so, then there is a break in the drawing, and the graft cannot receive the food it wants; while if the stock draws the same food as the graft, then it is drawing what is its opposite. If this is so, it is drawing and seeking for the means of its own destruction—a thing which is neither possible, nor in keeping with the arguments already adduced.

ADELARD: You are handling the matter like a sophist, and I must put an end to your quibbling. I grant you that the graft draws its food from the earth and through the stock. You go on "just as the stock also does." Granted. You then go down a step and say, "consequently, it is drawing in its own opposite." This too I willingly accept. Lastly, you make the inference that therefore it is of its own accord drawing in its own destruction. This, indeed, is not a descending, but tumbling down a whole flight; and I will clear up the matter in a word or two. The stock is drawing for itself and for a second thing: that which it draws for itself it keeps, that which it draws for the benefit of the graft, it passes on to it. In like manner, the stomach draws and seeks after whatever is necessary to the parts of the body, keeps what it wants for itself, and gives to those others what belongs to them. Similarly, both the stock and the graft abide by their own nature; and if after three days or a longer time you were to cut off the graft, you would find the stock of the same nature as it had been before.

NEPHEW: What you have said on this point is childish—mere probable conjectures rather than necessary truths. Let us then proceed to the nature of living beasts, for there I cannot help thinking I shall put a spoke in your wheel.

ADELARD: It is a little difficult for you and me to argue about animals. I, with reason for my guide, have learned one thing from my Arab teachers, you, something different; dazzled by the outward show of authority you wear a head-stall. For what else should we call authority but a head-stall? Just as brute animals are led by the head-stall where one pleases, without seeing why or where they are being led, and only follow the halter by which they are held, so many of you, bound and fettered as you are by a low credulity, are led into danger by the authority of writers. Hence, certain people arrogating to themselves the title of authorities have employed an unbounded licence in writing, and this to such an extent that they have not hesitated to insinuate

into men of low intellect the false instead of the true. Why should you not fill sheets of paper, aye, fill them on both sides, when to-day you can get readers who require no proof of sound judgment from you, and are satisfied merely with the name of a time-worn title? They do not understand that reason has been given to individuals that, with it as chief judge, distinction may be drawn between the true and the false. Unless reason were appointed to be the chief judge, to no purpose would she have been given to us individually: it would have been enough for the writing of laws to have been entrusted to one, or at most to a few, and the rest would have been satisfied with their ordinances and authority. Further, the very people who are called authorities first gained the confidence of their inferiors only because they followed reason; and those who are ignorant of reason, or neglect it, justly desire to be called blind. However, I will not pursue this subject any further, though I regard authority as matter for contempt. This one thing, however, I will say. We must first search after reason, and when it has been found, and not until then, authority if added to it, may be received. Authority by itself can inspire no confidence in the philosopher, nor ought it to be used for such a purpose. Hence logicians have agreed in treating the argument from authority not as necessary, but probable only. If, therefore; you want to hear anything from me, you must both give and take reason. I am not the man whom the semblance of an object can possibly satisfy; and the fact is, that the mere word is a loose wanton abandoning herself now to this man, now to that.

CHAPTER VII.

WHY DO SOME ANIMALS CHEW THE CUD, AND OTHERS NOT?

NEPHEW: By all means let it be as you ask. It will be easy for me to oppose you on the ground of reason; but do not take shelter under the authority of your Arab friends. Let reason then be the only judge twixt you and me. Now, since we are to discuss the brute beasts, I will ask you why some chew the cud, and others not.

ADELARD: The natures of animals, like those of human beings, differ. Some of them are naturally hot, others cold, some moist, and others dry. Those which are hot more readily digest the food they have taken in, and more easily change it into blood, while cold animals have more difficulty with this. Everything subject to change is altered more easily by heat than by cold, for fire has, as it were, the property of sundering what is conjoined. Consequently, those animals which have a hot stomach easily

digest their food. Others, however, which are of a cold nature, being unable to digest their food, bring it back, and use their teeth again upon it, in order that by a second process it may the more readily be softened: this is done by oxen, goats, and similar animals, whom the Greek physicists call "melancholic." How all these animals are of cold nature is clear enough to the physicists, and you may get an idea of it as follows: it is for this reason, that they have both their fat harder, and what is commonly called the paunch (sepum) more solid; while others, as being warmer, have the fat softer, it being better digested, or to use the common phrase, more greasy.

NEPHEW: If, therefore, these animals ruminate on account of their cold nature, why are not the horse and the ass ruminants? They, as I have learnt from the physicists, are also melancholic.

ADELARD: But not to the same extent; for their stomach is considerably warmer, and their teeth better adapted for grinding.

NEPHEW: Oh, no, you will not wriggle out of it in this way; for if, as you say, this happens to them by reason of their coldness, why do not sheep, since they are of warm complexion, make the same demand?

ADELARD: Though they are by nature warm, yet their poverty in the matter of instruments has the result of forcing upon them the same toil, for there is no strength in their teeth, and for this reason they are called bidents. Furthermore, they are only of moderate heat, having also the paunch like that of the melancholics.

NEPHEW: Very good; if because they are melancholic they are, therefore, ruminants, then it would be the lot of some human beings also, who are melancholic and of cold nature, to be ruminants.

ADELARD: It may be that by comparison with others of their kind some men are cold, yet in comparison with the other non-speaking animals, we judge them hot. But what I am going to tell you will upset your contention altogether: I have seen some men whose stomachs were of such cold quality, that not being able to digest the food they had taken, they could not manage to retain it, with the result that not long after a meal, they brought up any heavy and indigestible food they had eaten.

CHAPTER VIII.

WHY DO ALL RUMINANTS LIE DOWN HINDER-PART FIRST AND FRONT-PART AFTERWARDS?

NEPHEW: On this topic let what you have said be enough: I now propose to ask the following question, Why do all animals

which ruminate, and are provided with a paunch, lie down hinder-part first and front-part afterwards?

ADELARD: You have put several questions into one, for these three things—to ruminate, to have a paunch, and to rise back-part first are co-accidentals coming from the same cause, viz.: coldness. But this coldness is not present in all the limbs equally; for it is greater in the hinder ones and those further removed from the heart, in which consequently there is bound to be greater weight.

Rightly, therefore, do they lie down heavier part first.

CHAPTER IX.

WHY DO SOME ANIMALS GET UP FRONT-PART LAST?

NEPHEW: Then now my point is established. For if they lie down hind-part first because they are cold in the hind-part and warmer in the front-part, then they would be bound to rise front-part first, and as this consequent does not happen, then the antecedent also is absurd.

ADELARD: Whatever rests does it in order to regain the strength which toil has lessened. Therefore the animals we are discussing, after their strength has been refreshed by rest, and while that strength is fresh and vigorous, begin by raising that part of their bulk which is the heavier. Just so you, I imagine, when engaged in work deal with the heavy weights while you are fresh and full of strength, and afterwards when tired with the lighter ones.

CHAPTER X.

WHY SOME ANIMALS WHICH DRINK DO NOT URINATE?

NEPHEW: That this should be the case is neither necessarily true, nor yet impossible. But now I wish you to resolve this question, why do some animals which drink not make water? Considering that the superfluity of what they drink descends to the kidneys and gathers there, and should thence flow out through the member, it is strange that some birds, e.g., the dove, drink much, and yet, though there is every reason for their doing so, do not make water.

ADELARD: Some animals when first born are reared on a soft and semi-fluid substance; I mean milk, the greater part of which is watery, and only a small fraction earthy. Others are reared on a hard substance, e.g., pebbles, sand, and the like, for instance, birds. Those then which live on a watery diet have a

bladder and make water. Howbeit as the dryness of their food makes itself increasingly felt in them, it becomes necessary for them to drink a little, that by this small amount of water the way may be made easier for solid food also and pain spared to the organ through which the hard substances descend. We must not suppose according to the opinion imputed to Aristotle that the paths by which food and drink enter the stomach are separate and distinct. For in the same way food descends into the stomach, and then, if they have one, into the liver. As therefore the moisture is not nourishment for the body, but is only present in small quantities to make easy the passage of solid food, it requires no separate exit for itself.

NEPHEW: As you have mentioned the stomach parenthetically, I ask you now why some animals have a stomach, and others not?

CHAPTER XI.

ADELARD: As you are conducting your enquiry along the line of reason, I will give you the reason of this. Those animals which live on pebbles and sand have no stomach, but still require something of a hard character, viz.: the liver, which is stronger than the stomach in respect of propulsive power, and can withstand the roughness of the sand and the chipped edges of pebbles, being provided with very strong muscles on both inside and outside, while between them lies flesh of the most solid character. By means of the interior substance it is able to retain its contents; by means of the fleshy part it digests the same; while by means of the exterior substance it is able, should anything, breaking the inner barrier, try to make its way out, to prevent it from penetrating to the vitals.

CHAPTER XII.

WHY DO SOME ANIMALS SEE MORE CLEARLY BY NIGHT THAN BY DAY?

NEPHEW: In spite of your explanation, I have still some difficulty about the brute creation. Why is it that some of them see more clearly by night and others by day? We know that light is an aid to sight, and darkness the reverse.

ADELARD: The eye, which is the instrument of sight, necessarily contains various humours. One, which is white, is an aid to sight, and through it the spirit of sight both issues forth and spreads. Another is black, and prevents the spreading from being too great: through it, as being dark, both heat is spread, and a constraining influence exercised. Those animals, therefore,

which see less clearly by day than by night have the white humour in abundance, and the black to a smaller extent; hence, in the daytime, the spirit goes too far forth, and by the excess of its diffusion loses the power of distinguishing the objects of sight. By night, however, by reason of the exterior darkness, it becomes more concentrated, issuing forth with greater clearness, and seeing more clearly. This point can be established also as follows:—you have noticed that some people have eyes whiter than they should be, and hence but poor sight, and if you took them out on to a wide expanse white with snow, they would be able to see little or nothing. Again, you yourself, if you want to see anything particularly clearly, have to contract your eyebrows. Hence we see that sight, when concentrated, does not wander, but gets a clearer impression of what has to be seen. This point will be manifest to you later if you have the wit to grasp it.

CHAPTER XIII.

HAVE THE BRUTE CREATION MINDS?

NEPHEW: Would you now discuss the question as to whether brutes have minds?

ADELARD: On this point there is to-day a difference of opinion: the common people unhesitatingly say no, while philosophers are equally confident about the opposite. My reasons for saying that brutes have minds are as follows:—Brutes have senses; and every perception must either follow the movements of the judgment, or not. Therefore, the perception of brutes follows either something or nothing. For instance, when I turn my eyes in any direction, I form a judgment about the things I see, understanding that what seems to be white is white, or the like. Sometimes, too, I see an object without forming any judgment on it; this is when my mind is occupied with other matters. The senses, indeed, have no judgment or understanding of the objects on which they are exercised. Consequently, if they have no judgment about the objects of sense, animals would have no set purpose of seeking them out or fleeing from them. For instance: whatever you see without having any understanding of, that, as a result of that perception, you neither seek after nor flee from—an experience common enough every day both to you and everybody else. Assuming then that brutes have no set purpose about exterior things, tell me, if you can, how it happens that a dog, hurrying at the top of his speed towards some object, turns off from it if he sees something in the road which, I won't say hurts him, but merely might hurt him. What was it that so quickly changed his first aim to its opposite? Animals clearly have in their minds both purposes, that of seeking out and that

of fleeing from, and must consequently have something which tells them whether to seek out a thing or flee from it, and this something, not being corporeal, must exist only in the mind. Hence it follows, that animals must have minds. Further, every sound heard coming from someone else either produces some understanding in the hearer, or does not. If it produces no understanding in the hearer, then he is not on account of that sound (i. "momentum" for "nomen tunc") impelled to do anything, for it suggests nothing to him. This is what we mean in regard to brutes when we talk of anything as being suggested to them: for either it begets understanding in them, or it does not. If it does not, then it excites or produces no motion in them towards action. If, therefore, this were the case with animals, they would neither initiate any plan on account of a sound heard, nor avoid one. Tell me then this, if you can: how should a dog in that case on hearing the voice either immediately abandon the course he has begun, or start an opposite one? Further, perception and the distinction of the perceptions are not the same: moreover, the power of distinguishing any things whatsoever, and more particularly those which are the objects of perception, can reside only in the mind. And animals do display the power of distinguishing between the objects of perception; for not only does a dog in pursuit of an animal perceive its scent, but if another of the same species cross his path, he being cognizant of the scent of both of them, distinguishes between them: mindful of his trainer, he despises the one, and prefers to follow after the other, for he has, as it were, an impression in his mind—this is the one I ought to follow; the other is not the same; and in making this notable difference, there is a subtlety which betokens no little judgment of the distinguishing sort. Hence it follows that brutes also must have a fundamental power of distinguishing.

NEPHEW: Never shall you compel me to admit more than I have learnt from the common cry, that brutes have perception but not understanding.

ADELARD: Fie on you! you forget our agreement that reason should preside over our discussion. Now, perception is an ambiguous sort of word, so let us consider its meaning, and then we can make up our minds. To my idea, the definition of sense is a *considerable change of mind and body*, due to *external contact*. If this definition is to be accepted, we must first provide grounds for its acceptance. First, the word "change" is rightly used; for in every movement affecting the senses, the quality of the body undergoes change, either by approaching something else, as in sight and touch, or by the approach of something else to itself, as in smell, taste, and hearing. The quality of all functioning organs is changed by contact with external bodies. Change, therefore,

is common to all senses; but because there are some changes frequently occurring in regard to the body which, on account of their great subtlety, affect little change on the qualities of the organs—the mind never aroused by them to an act of judgment—e.g., contact with an atom or an almost imperceptible smell—I have added to my *differentia* the word "considerable." Also, since in regard to inanimate bodies from contact with others and with themselves, considerable changes in their qualities are frequently produced, so that they are changed to effects contrary to those produced by their separation, I have said animate body.

Lastly, because a considerable change is often wrought in an animate body from internal causes and the mere motions of the mind (e.g., redness from anger and pallor from sadness), in order to separate these, I have added "by external contact." We have, then, now a complete definition with equality of convertible terms; it cannot be called either too wide or too narrow, and there is no doubt that it is correct. This granted, it follows that my argument is correct, and that just as there cannot be sense except in relation to an animate body, so they cannot exist without a mind. Further, to go outside what I have said about the senses, let me taken an argument from motions. There are several sorts of movement, some especially referable to the body, others more particularly to the mind. For as a result of the fire in them, bodies can move upwards, as a result of the earth, downwards: as a result of the air and water, to the right and to the left, backwards and forwards; while orbicular motion is referable, in the first place, to the mind only. Since then this movement occurs in animals (note that they move of their own accord), it follows also that they have minds.

CHAPTER XIV.

HAS OPINION ITS FOUNDATION IN THE ANIMATE BODY?

NEPHEW: Methinks I am altogether opposed to your arguments. That animals have not understanding nor power of distinction, but only opinion, I will grant; and this I assert to have its foundation not in the mind, but in the body. Reason proves that rational judgment has its foundation in the mind; while with regard to opinion as it exists in brutes, I am quite clear that its seat is in the body, not the mind.

ADELARD: I look at the question whether even opinion itself may not have its foundation in the animate from the following point of view: we ourselves being rational, have both a power of distinction existing in the judgment and an opinion about objects of sense, but neither the one nor the other can exist in our bodies minus the mind. Now, if in the human body, which

is composed through a conjunction of elements of earthy materials, there exists that which arises from the senses—call it what we will, it cannot abide in it unless mind is present also. Much less then can you look for it in the brutes, unless you are quite out of your senses. If, on the other hand, you are not ashamed to say that it can abide in it without a mind from the mere conjunction of elements, then you lay yourself open to the charge of degrading human bodies to a lower position than the others,—a thing obviously false.

NEPHEW: Very good; let us then agree to say that brutes are animate, but say at the same time that their minds, when separated from the body, perish, awaiting, as they do, neither reward nor punishment for their deeds.

ADELARD: How wrong-headed is your change of position! You say that the body which is of vile and changeable essence, liable to generation and corruption, composed of a diversity of elements, not certainly existing but continually and always passing from one thing to another, and neither this nor that—this, you say, does not perish, while the mind, its guide, divine and incorporeal, the directress of nature in its totality not in particularity, does perish! You must be mad. It is rather you yourself who perish, when you so wrongly lose confidence in so noble an essence.

NEPHEW: What you say merits attention rather than belief. However, I will gird myself to higher themes, and do my best with such poor knowledge as I have to bring light out of the smoke. True that I am unacquainted with the idle vauntings of the Greeks, and have not seen the cave of Vulcan, yet have I learnt by practice to know the true, and disprove the false. To work then! I want to discover what you think about human nature. You may magnify as much as you will what you have said previously, but if you do not know yourself, I think such things of small account: man's proper subject for discussion is man. For just as a stupid work based on enquiry into subtleties (or, as a futile handling by means of a subtle enquiry) lowers the mind, so a lofty subject-matter sharpens the mind's eye for investigation.

ADELARD: As I have now managed to supply an answer to your question, it shall be your business to propose whatever you want treated, and mine to discuss it.

CHAPTER XV.

WHY HUMAN BEINGS DO NOT HAVE HORNS.

NEPHEW: I want to talk about the composition of man; so, please, first explain this difficulty: Why do human beings not have horns?

ADELARD: Be it as you will; but first I must get from you a reason, either true or likely, why you think they ought to have them: otherwise such a discussion deserves no place between philosophers. For my part, I do not think it is worth while to find causes for all existing things, but for those which reason suggests to us ought to be different from what they are.

NEPHEW: Your request is indeed fair. Reason tells us that all things which the Creator drew from the formlessness of nothing into the form of being were, as being made by the Best, made in the best way, and that He gave the faculty of existence to all things made by Himself, for they both joy in living, and are provided with definite weapons in order that they may preserve their lives. Now certain animals—and it is of these I speak—have definite means of protection which are part of themselves, e.g., the boar, his tusks; the lion, his claws; the bull, his horns; and with these, if danger threatens, they defend themselves; others again, not big enough to defend themselves by size of body, save themselves by their speed, e.g., goats, deer, hares, etc. Seeing then that this is so, that creatures of lower rank are naturally protected,—I ask you how it is that man, who is of higher rank than the lower animals, has neither natural arms of defence, such as horns or death-dealing tusks, nor speed of flight by which to escape the foe's menace. The result is, that having no weapons provided by the Creator, he has laboriously to provide them for himself from external sources, while in time of stress he has to put his confidence in the feet of another creature rather than in his own. We thus have the creature, who is dearest to supreme goodness, deprived of supreme help.

ADELARD: I will first give you an obvious answer. I believe that as man is the creature dearest to the Creator, it is not fitting that he should be naturally provided with weapons, or have the power of fleeing over great distances. He has what is far better and nobler than either of these things, I mean reason, in which he so pre-eminently excels the brutes that by means of it he can subdue them, put bits in their mouths, and then train them in various exercises. You see then by how much the gift of reason transcends all natural weapons.

NEPHEW: The fool would accept your answer, but not so I, for you have not answered my question. Naturally, I have no hesitation in admitting that reason excels all physical means of offence. My point is this: even those men who excel their fellows in reason are at times in need of protection against threatening danger, and this to such an extent that they are compelled to get both weapons and means of transport from external sources. *(Here the text seems corrupt, and one line is untranslatable.—Ed.)*

It would be more fitting that, having reason, they should need nothing further, than that, while having it, they should be compelled to seek indispensable help from outside.

ADELARD: As you allow nothing irrational in place of reason, let me tell you what I think is the most probable explanation. Man, as being a rational and therefore social animal, is adapted for two operations, action and deliberation, or, as we call them, war and peace. Daily life teaches him that in the activities of war arms are required, but in time of peace truth teaches him to lay them aside, and remove them far from the innermost chamber of his thoughts, for the one is provoked by wrath, to the other reason gives its sweetness. Consequently, if man were provided with natural weapons, he would be unable, when engaged in making treaties of peace, to lay them aside. Again, if his protection lay in nimbleness of flight, he would be inconstant, and without fixity of purpose, and, thanks to the useless graces of his structure, would prove but a weakling in war. As things are, he takes up arms when necessity arises, and again at the behest of peace lays them aside. When there is need he can of set purpose be nimble-footed, and when the need no longer exists, he is able to return to fixity of purpose.

CHAPTER XVI.

WHAT METHOD WAS ADOPTED TO DISCOVER THE CONTEXTURE OF VEINS AND SINEWS?

NEPHEW: Yes, that is all very nice. But since we are now going on to discuss the composition of man, I should like this point cleared up:—How the contexture of veins and sinews in our bodies was discovered by the physicists. For as this is so complicated that the physicists use the simile of a net in speaking of it, if a dead body were simply cut open, the result would be that, in the very act of cutting, sinews and veins would be destroyed.

ADELARD: I think I can manage to answer your question: but my much reading has, perhaps, dulled my memory. For I once heard an old man at Tarsus in Cicilia (*sic*) saying:—When philosophers thought it of importance to investigate the systems of sinews and veins, they managed it (*reading*, not *assecuturos*, but *assecutos*), I imagine, in the following way: They fastened, no doubt, a human corpse in a river, and kept it exposed to the current until all the skin and flesh had fallen off, while the sinews and veins, which are of stouter material, were left behind. Such was the way in which the contexture was made clear to them.

CHAPTER XVII.

WHY MEN OF GOOD ABILITIES HAVE WEAK MEMORIES, AND THE CONVERSE.

NEPHEW: Even though it was not done as you say, yet it might have been: so let us go on. In your long array of words, you have made mention of ability and memory, and I will therefore mention a point which seems to me to require elucidation. It is this: Memory, being nothing else than an unerring retention of the things which are apprehended by the intellect, how is it that some men, although they have good abilities, have absolutely no memory, and cannot, when required, remember with the same ease the things which they easily apprehend, while—and this I find still more surprising—those who learn with greater difficulty often have much stronger memories?

ADELARD: You are right in asking this, and I hope will take my answer with good will.

NEPHEW: Yes, most gladly.

ADELARD: Whatever operation of this sort the mind performs in the body, it performs with a certain amount of assistance from the body, and this is done in one way in the brain, in another in the heart, and in yet another in the other members. In the brain it uses a fantastic movement, *i.e.*, that of the intellect: a reasoning one, *i.e.*, the judgment; and also a memorising one, *i.e.*, the memory. First it understands, then judges what has been understood, and thirdly commits that judgment to the unchanging part of itself. These various operations, however, are performed by different instrumentalities: the intellect depends on moisture for its strength, but the memory on dryness. Whatever is moist easily takes various impressions, but these impressions are readily destroyed, owing to instability: what is dry takes a definite impression with greater difficulty, but this impression when once taken is not easily changed. Hence it comes about, that those who have a moist brain have powerful intellects but weak memories, while those who have a dry brain have powerful memories but little intellect.

CHAPTER XVIII.

HOW THE SEATS IN THE BRAIN OF FANCY, REASON, AND MEMORY HAVE BEEN DISCOVERED.

NEPHEW: No doubt you will give an equally probable answer to my next question, and consequently I do not doubt that you will be kind enough to answer it. What I want you next to do is to discuss a point about which many people are in ignorance.

As we are talking about things that have to do with the brain, will you, if you can, explain how the seats of fancy, reason, and memory have been discovered by philosophers? Aristotle in his *Physics*, and others in various treatises, lay it down that fancy has its seat in the anterior part of the brain, reason in the middle, and memory in the occiput, and they have therefore given these three compartments the names of fantastic, rational, and memorial. To be able thus to localise the various operations of the mind shows great cleverness on their part, dividing up, as they have, the small area of the brain according to the various operations, especially too as it is impossible for the senses to distinguish operations of the kind.

ADELARD: When one does not understand, everything seems impossible; but as soon as one does, it is just as readily seen to be quite simple. I imagine that the man who first studied these compartments with the idea of distinguishing them learnt this fact about them by means of experiments based upon the Senses. There was, no doubt, someone who had at one time full use of his fantastic faculty, and then was injured in the anterior part of his head so badly as to lose fancy, without however being deprived of reason and memory—a phenomenon marked by the philosopher. Similarly, when by injuries done to other parts other operations of the mind have been stopped, it has been easy to establish with certainty what operations are carried on in each compartment of the brain; and all the more so, as in the case of some people the very compartments are marked out by fine lines. Hence the imperceptible and intellectual operation of the mind has been made clear by facts noted by the senses from outside; for even the mind itself, though an incorporeal essence and subjacent to none of our senses, is clearly shown to be in the body from the operations evident to the senses which it performs there. From the movement which it gives the body, though it cannot be seen, it is proved to exist incorporeally in the body.

CHAPTER XIX.

WHY THE NOSE IS PLACED ABOVE THE MOUTH.

NEPHEW: When you explain things which, as it seems, should be different from what they are, the more I hear, the more I doubt. Although, as we said before, reason teaches us that all things which have been made by the almighty Creator are perfect, there is yet one thing in the framework of man which I wonder at exceedingly,—why the nose is situated above the mouth. In the whole framework there is nothing more seemly than the mouth, and experience shows us that there is nothing that keeps in a

cleaner condition. But what could be moister—not to say dirtier—than the nose? And this is so much the case that from it much wrong threatens the seemliness of the mouth. Hence, if it be not wicked to say so, it might seem a fitter arrangement were the mouth above the nose.

ADELARD: Yours is the idea of a man who does not see clearly, for you do not understand that nothing which is natural is filthy or unbecoming; while whatever is contrary to nature, no matter how fairly adorned it may be to the sight, is in itself rightly called both evil and filthy. To come back to the point: the nose and mouth are not principal members, but servants of principal members, for the nose is the servant of the brain, and the mouth of the stomach. Since the brain by a certain necessity of its operation is moist, and also since a certain vapour of external moisture rises up to it from the food in the stomach, it needed some fleshy attachment by which the superfluity of moisture might be discharged; and further, since a sort of slight spume by reason of the digestion of all sorts of foods naturally rises from the stomach, it was fitting that this spume should be discharged through the nose. Hence it is necessary that the nose should be near the brain, and the mouth near the stomach, and all the more so, as it is only through the mouth that food could reach the stomach.

CHAPTER XX.

WHY MEN GO BALD IN FRONT.

NEPHEW: Now that this question has been settled, I want to enquire about another matter. Since our discussion has to do with the properties of man, I should like to ask you why men go bald in front rather than behind. If, as reason teaches us, the front part is in a sense more worthy (for which reason also it has the glory of being the seat of the senses), it would follow that it is less fitting for it to be deprived of the luxuriant grace that the hair gives it, especially as men regard baldness as a ground of reproach: and to that reproach we should be less open if the baldness were behind instead of in front.

ADELARD: What you speak about arises from what we have said previously; for since what goes down into the stomach must necessarily enter through the mouth, and be digested in the stomach itself, and since it is clear that from the stomach vapour must in consequence, as a result of digestion, travel upwards by the same path, it follows that just as that path is nearer to the front part than to the occiput, so the pores of the flesh itself and of the head are bound to be more open in

it—a fact which can easily be verified by examining the head of a bald man, for the brain gives out heat, and that heat, if not given out, would generate madness. The result then of the issuing forth of this heat, together with the abundant inflammation, is a too great opening of the pores. Any hairs that happen to sprout up lose the continuity of the soil in which they grow, and so their further growth is prevented; and even though they are recognised as springing from vapour, yet they cannot take root without continuity in the surface on which they grow, just as they cannot exercise their activity without some dampness of the external coherence; hence it happens, that this scarcity of hair is found more frequently in the young as having the warmer nature.

NEPHEW: What you have said on this subject is enough. Certain other matters there are: Why is it especially in old age that some men grow grey, though some occasionally do at other times of life? Why only men have beards, for seldom or never do we find them in women or eunuchs? But these points have been discussed by others, and I shall not trouble you with them. As however we have begun to discuss the things that have to do with the face and head, I think we ought to try to clear up what has to do with the senses. In my view, nothing that has to do with the corporeal composition of mankind is either more difficult to understand or more difficult to explain in mutual discourse; for while the common sort of men either unjustly claim for themselves knowledge of nature, or else regard it as something to be lightly esteemed, it happens in the long run that phenomena take place in themselves, which they are unable to explain. Boethius, speaking of the senses, says in his book about music, "Among philosophers the point is held doubtful, but the common folk know not what it is to doubt." Let us, therefore, listen first of all to your views about hearing.

ADELARD: I hear your question, but without understanding its drift.

NEPHEW: Just this: whether you agree with Boethius' views about hearing, or not?

ADELARD: He is too great a philosopher for me to quarrel with.

CHAPTER XXI.

HOW WE HEAR SOUNDS THAT REACH US.

NEPHEW: His views in regard to music are expressed as follows: voice is air, air is a body; it is impossible that a body, being incapable of division, should be present as one and the

same thing in different places at one and the same time, and consequently the same sound cannot be present at the same time in the ears of different people. What then actually happens he explains thus: the air in the mouth of the speaker being shaped by his mouth, and driven forth by it, gives the air nearest to it the same shape: this does the same to the next air, and so on in succession, until it reaches the ears of those near, but it is similar airs and not the same that they hear: this view Boethius supports by the comparison of the throwing of a stone, and the circles it makes (*sc.* in water).

ADELARD: You give a clear explanation of his meaning.

NEPHEW: Yes, but I regard this view as far from sound; for if different people are enabled to hear through the propulsive shaping of air, it is done by my driving away the air from myself. If then by sucking in, and drawing to myself the air in my mouth, I make a hissing sound, how is that to be heard by different people? And heard it most certainly will be.

ADELARD: We must try to understand one thing by comparison with another like it. This is certainly what he means by what he says about the different shaping of air and the nature of hearing (and while it was spoken by a philosopher, you must make allowance for his interpreters). From what happens in regard to the propulsive shaping when different airs travel to different people, the similarity of result can be understood also in regard to the shaping when the breath is drawn in; for just as when I form a sound by impelling the air from me, it is different hearings that come to different individuals, and are perceived by them, so when I draw the air inwards, and withdraw it violently from others, it is those withdrawals that are perceived by those from whom they come. The mind is by nature watchful; and just as when something from outside approaches the ears, it is aroused to an act of judgment concerning that thing, so also when anything travels outward from the ears and is drawn elsewhere, the mind is thereby stirred to mark the difference. Moreover, Boethius in what he says is speaking only about the nature of hearing in so far as it pertains to sounds of words.

CHAPTER XXII.

HOW IT IS THAT SOUND IN ITS PASSAGE MAKES ITS WAY THROUGH ANY OBSTACLE WHATEVER.

NEPHEW: You have not got to the heart of the matter, nor removed the flaw in the reasoning. Supposing an iron or other solid wall is interposed between me and the hearers, then it ought to be impossible for me to be heard when drawing in air

so as to make a hissing sound, for so solid an obstacle would prevent the air from being withdrawn from their ears. What are we to say about this? Invent an explanation if you can, and you will become to me a great Apollo.

ADELARD: I will invent nothing, but by explaining the hidden truth of the matter, I will do my best to merit the title. It is something you do not understand, and have not learnt, in all the wordy warfare of the sophists. Every metallic body, and even anything more solid than that, if such exists, is full of porous interstices which afford a passage to so subtle a thing as air. Hence you see that there is no impossibility about what I said, and we may as well pass on to the next question.

CHAPTER XXIII.

WHAT THEORY IS TO BE HELD CONCERNING SIGHT?

NEPHEW: Nothing could give me greater joy or pleasure than to do so; for we now come by a natural transition to the subject which is to me the most obscure in the whole world. We have heard what you have said about hearing; now let us see what you have to say about seeing.

ADELARD: Many different views have been expressed about the nature of sight, and it will be perhaps convenient first to set them forth, and then enquire which of them is the most reasonable.

NEPHEW: Then, if you approve, it shall be my task to state these various theories, and yours to state any objections there are to them when I have done so.

ADELARD: Your suggestion is a reasonable one.

NEPHEW: The theories I have been able to collect in various quarters about sight fall into four different groups. Some say that the mind, sitting in the brain as its chief seat, and looking forth upon outer things through open windows, viz., the eyes, gets knowledge of the shapes of things, and when it has got knowledge of them, judges them; it being always understood that nothing from the mind passes to the outside, and nothing from the shapes outside makes its way to the mind. Others, again, maintain that sight takes place through the approach of shapes, saying that the shapes of things give shape to the air that intervenes between themselves and the eyes, and that in this way the materials for judgment pass to the mind. Very many also assert that something is sent forth by the mind, i.e., visible breath, and that the shapes of the things that are to be seen meet it in mid-air: having taken shape from these, the

breath returns to its seat, and presents the shape to the mind for it to exercise judgment upon. A fourth party maintains that no shapes of objects approach the eye, but that something which they call "fiery force," and which is produced in the brain by means of concave sinews, passes first through the eyes, and then to the objects to be seen, and by returning to its point of origin brings back to the mind, with the same quickness as it went, the shape impressed upon it as though by a potter.

Let us deal first with the first theory. The use of all the senses belongs, as Boethius declares in his "*De musica*," to all living creatures; but what is their strength, and what are the limits to their use, is not perfectly clear except to the intellect of the philosopher; for both the effects of things follow upon the antecedent causes according to a most subtle nexus, and causes along with their effects differ from one another by the most subtle differences, so that even philosophers themselves often fail in their understanding of nature. Thus in the present case, if they mean that the mind placed in the brain as a seat regards external objects through the windows of the eyes, then when they assert this they will either be attributing a sort of power to the windows of the eyes, or else assigning no means of contemplating external things to these windows. But by calling the eyes windows, they are attributing to them a certain faculty for seeing external objects: do they then mean that the mind is a corporeal thing? In that case it would require a free and unimpeded means of egress without risk of injuring itself by coming into contact with other things; or do they think that in that conception of shapes which we call sight, there is some corporeal power needed for the mind to prevent it itself from being checked by contact with any obstacle, and that hence windows are required? But neither the mind, nor its consideration of external things, are corporeal things, and therefore they need have no fear of contact with corporeal things, and consequently, so far as the things perceived by them are concerned, do not require any corporeal opening. The formula then of these people includes no force, nor do they assume any path for the mind through the windows of the eyes, since they do not require this. This being so, why do they say that it sees external things through the eyes, especially as the eyes too are not perforated, but are more solid than the other instruments of sense, so that if the mind required any corporeal power, the ears or the nostrils (which have passages through them) would supply it. Further if, as is asserted, the mind should see the shapes of things by looking at external things, how could the human mind, by regarding a mirror, see the shape of its own face? The mirror, being opposite to its windows, it would be able to

see; but its own face, though opposite to it, could not be seen according to this idea. This theory therefore lacks consistency, and we must now discuss the second view previously stated.

ADELARD: By all means, nor do I see how the upholders of this first view are to get the better of your objections. It was on this account that a theory was propounded by the stoics, that external forms make their way to the mind itself, and that it is imprinted by them as wax might be. This it was that made Boethius in his "*de Consolatione*" say, "in by-gone days the stoic school introduced us to a set of out-of-date old men who hold that perceptions and images are imprinted on our minds by external bodies, just as at times it is people's habit to make and leave marks on the smooth paper with a swift pen." Although Boethius in the same passage attacks this idea as being pointless, I should like to tell you my objections to it as follows:—The shapes of things to be seen approach the mind of the seer either in their own subject and along with it, or in another subject and along with that. Now it is impossible that it should do so in its own subject, and not along with it; nor does the body that is seen approach me: therefore it must be in another subject, and along with that.

NEPHEW: In air and with air. For the body, as they say, gives shape to air, and that air to other air, till it comes to that in the brain which acts upon the mind itself.

ADELARD: If approach to the mind therefore were to be by such a transmission of shapes how could this be accomplished should a glassy body be interposed? Would not the advance be prevented through such an obstacle? Would not the air in the neighbourhood of the glass be acted upon by it? Will it receive shape from that of the more distant and less splendid body? This is of course absurd, and absurd too is the theory we are discussing. However, let us, as Boethius says in the "*Topica*," admit it for the sake of argument, that we may see what follows. Let us grant that the progression of shapes as far as the eye, is made by the eye even to the brain, or the air of the brain; but let us note that passage which they call a sort of potter's impression. If the air of the brain imprints its shape on the mind, it gives either that shape actually and essentially, or another like it. But that it should be the same is impossible, for no individual shape can pass from one subject to another, as in the passing the shape would be without a subject, which is impossible. On the other hand, if it imprints another shape, it will at once require local parts in the mind just as it had in the air, and not finding them in it, it will not be able by moulding to give shape to it. Since then this theory is obviously untenable, let us pass to the next. This one—the third—is held by those

who grant that a visible truth issues from the brain, but most certainly does not go so far as the body, which is relatively very far from it, for the reason that it finds the shapes it seeks in the intervening air.

Hence it has no need to do more than this, and consequently having been impressed returns, bringing back the shape to the mind by which it was sent forth. Those who say this do not realise what is the necessary consequence of their words; for if, as they assert, between the seer and the things to be seen, the air, by reason of the progression of similar shapes, offers to the visible breath that of which it was in search, then let us assume, first, a man looking from the east westwards, with the object of discerning the shape of a white body (and this, they say, he will find in the intervening air); next, at the same moment, assume another looking from the west eastwards, in order to behold a black body; and let him consequently by the same progression find the shape of the black body in the same intervening air: from this it follows, that the same or indivisible air is the subject alike of blackness and whiteness. Thus two contrary things, acting in opposition, are found in the same subject. But this is impossible, and we are therefore bound to reject the views of those who assert it. Finally, and beyond doubt, there is another consideration which, even if we put other objections on one side, is sufficient to upset all the views we have mentioned. It is this: we are familiar enough with the sight of our own shapes in a mirror; but this, though its reality is established by everyday life, does not agree with the theories we have recounted. It will be better, therefore, to deal with the view of which philosophy approves, and dismissing other theories as lacking strength, put our faith in this academic truth. This theory is as follows: In the brain there is generated a certain air of the most subtle nature, and made of fire, and consequently exceedingly light: this makes its way from the mind along the nerves, whenever it so pleases, and necessity arises, to see things outside. Hence it is called by physicists "visible spirit": being a body, it naturally requires a local exit, which exit it finds through the different concave nerves, which the Greeks call "optic," extending from the brain to the eyes: then travelling to the body to be seen, it makes its way with wondrous speed, and being impressed with the shape of the body, it both receives and retains the impression, and then returning to its original position, it communicates the shape it has received. Now this spirit is called by philosophers "fiery force," and this force, when it finds a mirror opposite to it, or any other light-giving body, being reflected by it, returns

as a result of the reflection to its own face, and still retaining the shape, when it enters, reveals it to the mind. You are not, however, to suppose that this fiery force found the shape of the face in the mirror; but, being reflected from the surface which is too smooth for it to abide there, received the shape while returning, and having received it, brought it back. This then is the divine theory which Plato has adopted, among other things, in his "*Timæus*." "There are, in my opinion," says Plato, "two virtues in fire, one consuming and destructive, the other soothing and endowed with harmless light. With this one, therefore, in virtue of which light bringing in the day unfolds itself, the divine powers are in harmony, for it has been their pleasure that the intimate fire of our bodies, own brother of the fire which is a passing bright, clear, and purged fluid, should flow through the eyes, and issue from them in order that through the eyes, slight, cramped, and affrighted, as it were, by the stouter substance, but yet offering a narrow medium, the more subtle clear fire might flow down through the same medium. Hence, when the light of day lends itself to the diffusion of sight, then no doubt the two like lights meeting in turn cohere into the appearance of a single body, in which the flashing brightness of the eyes meet, while the intimate brightness of the diffusion as it spreads is reflected by meeting with the image at close quarters. All this then goes through one and the same experience, and the result of that same experience, when either it touches something else, or is touched by it; moved by this contact, it spreads itself through the whole body, and making its way through that body to the mind and produces the sense which is called 'sight.'" Concerning mirrors and water, Plato says a little further on: "When both fires—the inner and the outer—fall together upon a light plane surface, they are formed into many different shapes, and the eidola rebound from the smooth surface." From these words of the philosopher you will see that just as truth, if never sought for, lay unnoticed, so also the false sometimes did not pass unnoticed: you will, I mean, understand how he says that the fiery breath emanates from the eyes, and is reflected from the object: nor does he forget to say that it suffers a similar experience, *i.e.*, a similar shape, and that it spreads, when returning, through the body of the eye: Then he says that it proceeds to the mind, and that thus is sight effected: in the case of mirrors, he says also that the same thing happens as a consequence.

CHAPTER XXIV.

WHETHER VISIBLE BREATH IS A SUBSTANCE OR AN ACCIDENT?

NEPHEW: I understand, and nothing could give me greater pleasure. For alike on philosophical grounds, from the physical effects of causes, and from ethical considerations, I am inclined to give my whole-hearted assent to Plato rather than to you.

I have now a task to impose both on Plato and on you, and I think it will annoy you both: for if, as has been previously explained, anything issues from the brain, whether with the physicists we call it visible breath, or—as Plato insists—the fire of our own bodies, it must necessarily be either substance or accident.

ADELARD: It is corporeal substance; for, as the philosopher says, fire is a most subtle substance, composed of the four elements.

CHAPTER XXV.

HOW CAN THIS SAME BREATH IN SO SHORT A TIME TRAVEL TO THE STARS AND RETURN FROM THEM?

NEPHEW: Certainly; for if it were an accident, it would not be able to pass to outer things without a subject. Since then you understand that it is a body, it is easy to understand what inconvenience would follow thence. The firmament, which by some is called *aplanos*, and by others the further sphere, contains all body and place: and when I speak of stars, I mean those upper bodies which not seeming to move are fixed in the plane. Well then, this fiery breath with a single glance of the eye, so to speak, sees the stars; and we have to admit, that a body in so short a time traverses and returns through as great a density of air as there is between us and the moon and the infinite space that lies between us and the moon, and between the moon and the sun up to the very *aplanos* itself; and this is mere madness and quite impossible, since the actual breath of the whole earth bears no sort of proportion to the infinite diameter of the sky.

ADELARD: That is the sort of difficulty that a man gets into who knows nothing of nature: do you then pay careful attention and store up in your mind what I am going to say. Just as of spaces some are wide, some wider, and some widest of all, so of bodies some I hold are swift, others swifter, and others swiftest of all. This, however, not everyone can understand. Just as the extent of the sky and its shape as laid down by geometers

is barely or not all clear to the vulgar mind, so to it such great speed in so short a time cannot be clear, though the eye in such people is swifter than the mind; for they measure, or rather mis-measure, everything according to the fallacious evidence of their senses in terrestrial matters. They think that the size of the sky exactly coincides with the earth, and that the bulk of the moon and sun and other things, which true reason would show them to exceed in size the earth, are not one whit greater than they seem to their bleary eyes. Those, however, who in matters of this sort are more apt to use reason, the incorporeal eye of the mind as their guide, just as they see clearly the magnitude of the external continent, or boundary, and the almost infinite extent of its diameter, so also see clearly the revolution of the heavens and the unutterably swift movement of the visible breath—and this in both cases, thanks to the use of reason. Just as the mind of the external sphere excels all created beings in the execution of virtues, so also this visible breath is more subtly perfected by the wonderful energy of creative virtue than all things compounded of elements. Just as the travelling forth of mind is the cause of that swift revolution, so the travelling forth of body is the reason of this swift going and returning, and it is not strange that the man who is ignorant of this should also be ignorant of and wonder at its effects. One thing more I must tell you, and that is, that not all the physicists agree with you in saying that the upper stars are fixed in the aplanos, for they assert that they move inside the sky at a far lower altitude—this point, however, I will deal with later on, if I live long enough. For the present, now that impossibility and space are dwindling, let doubt dwindle also.

CHAPTER XXVI.

HOW IS IT THAT WHILE THE EYE IS SHUT, THE VISIBLE BREATH IS NOT LEFT OUTSIDE?

NEPHEW: Nay, doubt grows from more to more, and I fancy that I myself shall dwindle away to utter nothingness before I give up doubting. Just imagine that while the visible breath is touching a star, the eye is shut. This is bound to happen, frequently, and the breath will then be left outside.

ADELARD: If only you would remember what I said previously, you would not raise this objection. The breath is very swift, and, as said above, it is established that it is sent by the mind, and through the mind. It is clear that the eye can be closed only by the mind, by which all voluntary motion is communicated to the body; let the consequence then of this also be

clear, that that which sends also receives; and when it wills, shuts the door in such a way as to involve no injury to itself; and so that nothing of its own may remain outside, especially too when the thing itself is of such speed that it immediately receives it back again. Idle then would it be to grieve over a disaster of this sort when the thing sent obeys nature which sends it, and a door is no resistance to one who obeys.

CHAPTER XXVII.

WHY THE BREATH DOES NOT HINDER ITSELF IN GOING AND RETURNING.

NEPHEW: I only hope that you, who while following Plato are tumbling into a pit, may have no causes for grief. I grant that in our discussion we should admit anything that has a possibility of truth, yet I think my next question will land you in difficulties. Assume that this breath, or if you will, fire, makes its way as far as to what is to be seen by it: is sight effected before it returns or afterwards?

ADELARD: It brings no message until its return.

NEPHEW: If therefore sight takes place immediately after its return, when we look at anything for a long while with fixed gaze and see it, it follows that it has both gone and returned at the same time, if we see the thing continuously and without any interval: hence both its going and returning will be simultaneous and without division, and therefore it hinders itself while going and returning.

ADELARD: Nay, it is you who hinder yourself, for as a result of your not understanding you make foolish objections; it does not follow that because we await anything with a continuous gaze that the breath when going is also returning, or hindering itself. When we say that it goes and returns so quickly, that when one return is accomplished, another starting takes place without a word, because there is no delay perceptible to any sense, since there is nothing that is manifest to sense, i.e., to the intellect, there is therefore no great need that it should go with the same speed after its return as it returned with after its going. As, however, this interval is not discernible to sense, the journey wrongly seems continuous.

CHAPTER XXVIII.

HOW THE MIND RECEIVES SHAPE FROM THAT BREATH.

NEPHEW: What wonderful things words are! When I con over in my mind my own opinion, its logic seems absolute and its coherence perfect; but when I consider your replies, I can

find nothing in them that is not sound. Consequently, by the unfailling readiness of your replies you win me over to your own opinion even against my will. Still, I must venture to remind you of your own words. Just now in your long harangue, when expressing the views of the Stoics, you said that shape could not be impressed on the mind potter-fashion by the air. This was a reasonable objection to take, and you must not mind its being retorted on yourself. Granted by all means that the Platonic fire returns to the mind with the shape without contact: but then it would be impossible for it to endue the mind with that shape; and this impossibility makes your whole edifice totter.

ADELARD: It is in you that the weakness lies: you are not trying to learn as you ought: your arguments are as shameless as they are pointless. I seek no concealment, but prefer the full daylight: and even if you do not know that, I am no Stoic, I tell you, but a citizen of Bath, and have no need to train my intellect in the mistakes of the Stoics.

NEPHEW: Very good, I say no more.

ADELARD: But first let me tell you this—the Creator of this wide universe has endowed the sensible shapes of all creatures with the same pre-excellent beauty He has bestowed on what we call the mind. Hence it is in His power to re-embodiy the past, to make what is absent present, and to foretell the future. Consequently, He does not bring forth the treasury of sensible shapes always, but only when it is necessary, or when it pleases Him so to do. The visible breath, therefore, being marked by a shape unknown up to that moment, the mind displaying not that shape but a similar one, and showing not a corporeal but a sensible one, expresses the quality of its own abundance, and is thence provoked to an act of judgment. Since therefore both coming and going presents no difficulty to the visible fire, nor is the passing on of the shapes any hindrance, let all honour and love be given to Plato, the discoverer of this divine scheme, and his followers.

CHAPTER XXIX.

WHY THIS BREATH, WHILE REFLECTED FROM A MIRROR, IS NOT IN THE SAME WAY REFLECTED FROM GLASS OF PERFECT WHITENESS, SO AS TO REPRODUCE THE FACE.

NEPHEW: I am afraid we are getting on too fast, and I must ask you first to explain the conformation of the mirror. For if, as Plato seems to say, that fiery breath falling upon a smooth and cleansed surface is necessarily reflected and returned, why is it that, when we look upon perfectly clean white glass, the face is not for the same reason reproduced?

ADELARD: A plain surface must be reckoned among the causes of the reflection, but it is not the only one: we must take into account also the density or obscurity of the body from which, whether of necessity or voluntarily, it is to be reflected. Hence, if upon that same white glass, which as being glittering and of slight density we may imagine to be penetrated by the breath, some black substance is superimposed, then the breath will be reflected and return to its own face, for it hates darkness and loves light, as being its like. The same thing also happens upon the untroubled surface of water, if it be darkened by a passing shade, and the reflections are produced which philosophers call shadows. Consequently, in regard to reflection, we must take into account both the lightness and density of the body, and also the shadiness of the earth where it is.

CHAPTER XXX.

WHY IT IS NOT THE SAME TO LOOK FROM LIGHT INTO DARKNESS AS IT IS FROM DARKNESS INTO LIGHT.

NEPHEW: One further difficulty I have in understanding the nature of sight. Anyone who is in the dark can see clearly what is going on in the light, while anyone in the light will not be able to see what is going on in the dark; this seems to me very strange. The distance is the same, for the distance from the light to the dark is the same as from the dark to the light; and it is to me matter for wonderment that just as the sight of the man who is in the dark can penetrate to the light, the sight of the man who is in the light cannot just as easily penetrate to the dark, especially as sight in the light would seem to have more strength for issuing forth, and therefore to be able to travel further than sight in the darkness.

ADELARD: That you are surprised astonishes me, for you talk about light as a blind man would. Let me tell you at once that the further visible breath travels from its origin, the weaker it becomes, and the weaker it is, the more easily it is hindered: hence, the breath which is sent forth in the light, though starting in great power, is nevertheless weakened on the road as it gets further from the brain. Thus made weak, and coming into contact with the darkness, it loses all power over itself, and is unable to do more than to return to its point of origin without having accomplished anything. That breath, on the other hand, which issues forth in the darkness in close proximity to its own brain, has just the opposite experience, and does not succumb, for it has the brain close at hand from which to replenish its strength. Again, if it loses some part of itself on account of the

length of the journey, yet since now it has light and not darkness, it discerns what it finds in the light. So you will see, that what you suggested is actually the exact opposite of the truth.

CHAPTER XXXI.

THE NATURE OF SMELL, TASTE, AND TOUCH.

NEPHEW: I have no further doubts on this subject, and should like you to talk to me about the other senses; for so long as doubt possesses my mind, I look upon your assertions with a hostile eye, but when once my doubts have been dispelled, good-will returns. It is not my nature to make the scholar's gown a cloak for disparagement.

ADELARD: I think I ought to touch briefly on these points, especially as they proceed from pretty much the same cause as sight, and admit of the same explanation, which is as follows: Smell, Taste, and Touch are the result of the conjunction of the corresponding organs with external objects. Thus, in order to effect smell, the air given off by the cause of smell is brought into contact with certain small nipples from the brain and tentacles, which are the organs of this sense. Anything to be tasted is brought into contact with the tongue and palate, the organs of taste. Sometimes the hand is applied to the object to be touched, at others the object is applied to the hand. Hence it is necessary that the qualities of the organs should play an imitative part, and for the following reasons: these organs—to deal with them generally—have qualities specially adapted, and excelling the other parts of the body—the nipples specially adapted to smell, the tongue and the palate to taste, and the hands to touch. Hence it happens, that when anything is applied from outside, some quality of which exceeds the amount present in the organs, then a like sensation being produced in the subject, and increasing till it becomes perceptible, brings about a change of the previous state of the organ,—an example of this can be seen in touch. For when the palm of the hand is experiencing heat, cold, or other similar sensation to a moderate extent, if anything hotter or colder is brought into contact with it, its heat, which was before equal, now becomes unequal; similar examples can be given in regard to the others also. Hence the mind, perceiving this inequality of its organ in respect of past and present temperature, concludes that what has been touched was hot. Similarly, smell and taste are also matters of the senses, and what has been said here will apply also to them.

NEPHEW: Yes, certainly; and now that we have dealt at some length with the Senses, I should like to know your views about

other points connected with man; and if you can explain these with the same consistency, I shall no longer doubt that you have a mind adapted for the highest flights.

ADELARD: Whenever you want to soar, you will find me ready with my wings on.

CHAPTER XXXII.

HOW IS IT THAT JOY CAN BE THE CAUSE OF WEEPING.

NEPHEW: All right: as we should start upon our upward flight, we ought not to delay over these unimportant matters. When the other day you were coming from the East, where you had stayed studying so long, I, who longed for your coming more than anything else, found myself shedding tears for joy, and what ought to have been the cause rather of laughter plunged me into weeping. As I am not the only person who is said to have experienced this, I am fain to believe that the causes of things rather than myself will be found to have changed.

ADELARD: The causes of things are easily found by a man of intelligence, and joy is certainly the cause of laughter. When, as a result of joy, the mind is filled with cheerfulness, it happens also that the cause of that joy spreads through the body natural heat which reaches as far as the brain; when this heat is very great, if it finds such moisture there it naturally makes it evaporate, and expels it through its natural exit. So we have established the consistency with reason of the causes of things.

CHAPTER XXXIII.

HOW IS IT THAT WE BLOW AT ONE TIME HOT, AT ANOTHER COLD—AIR FROM ONE AND THE SAME MOUTH.

NEPHEW: I will now suggest for our discussion an experience of our daily life. How is it that a man can blow from his mouth either hot or cold air, just as he pleases? We are told by physicists that all such air comes from one and the same lung, and travels along the same path: is it not strange then that the two opposite effects can so quickly succeed each other?

ADELARD: This, as being a matter of possible doubt, is fair matter for discussion. It is, as you say, the case that both hot and cold air proceed in this way from the lung, but they do not do so indiscriminately. When the air issues from the lung, if it is immediately emitted from the open mouth, since it comes from heat and nothing happens to it on the road, it will be felt to be hot; if, however, it is not emitted at once, then because it is

delayed, it is less hot than not only the lung but even then the passage by which it travels: a considerable fall of temperature is the result, so that when you want to use it for cooling anything you confine the breath between your lips, and blow it out through a narrow aperture, thus making it cold, no element being more easily changed into different qualities than air.

CHAPTER XXXIV.

WHY FANNING DOES (NOT) PRODUCE HEAT.

NEPHEW: As you have mentioned the movement of air, I should like to move a question arising out of it for our discussion. It is beyond doubt that movement is the cause of heat; why then is the air set in motion in order to produce coldness?

ADELARD: Motion certainly produces heat, but it is a different question that is involved in your objection. When we use a fan, we do so in order to cool down our inner heat by the admixture of external air which is not so hot. In the case of all of us our inner air when we perspire is hotter in degree than the outer, and by fanning we mix with it the outer air, in order that thus being brought through the pores into contact with it, it may by mingling with it cool it.

NEPHEW: When you speak in this way, you are basing everything on the word "degree." Remember, however, that just as contraries are neutralised by contraries, so like is increased by like. Hence if the inner air is hot, and the outer also is under the influence of heat, the two heats must necessarily unite, and greater heat be the result.

ADELARD: You are mistaken, and your objection is a mere quibble. In cases of this sort, it is not the fact that, if the less be added to the greater, the total is made greater. What is quoted as an Aristotelian principle that, if anything smaller be added to a thing, the whole is made greater does not, if rightly understood, apply to effects but to quantities: the words "greater" and "less" are used in two senses, (1) as referring to quantity, (2) as said above, to effects. Granted that these two white bodies are of the same size, and that the whole surface of each is white: one of them, however, will be whiter than the other, and therefore though as far as quantity or extent of whiteness is concerned, they are equally white, yet as regards intensity the words "more" and "less" can be used of them, for one has greater intensity than the other.

Just so is it with regard to heat and cold: for instance, if to boiling hot water, water which is luke-warm and therefore less

hot be added, the quantity indeed both of the substance and of the heat is made greater, but the intensity is not similarly affected or made hotter; and the same applies to airs.

NEPHEW: I still have something to say to you on this point, though I have nothing further to say in regard to the increase of heat; for, in the light of what you say, I quite understand that quality does not increase quantity in the matter of intensity; but that it should diminish it surprises me, for I find thus contrariety in similitude. If you add lesser fire to fire, both the quantity is increased, and the intensity heightened; and if you ask those who are near it, they will tell you that not only does the fire rise higher, but that they feel it hotter. Yet in the case of water, our perceptions tell us that the opposite happens, and it is quite clear that both you and the water are going against the order of nature.

ADELARD: No, no; in your unwise pursuit of likeness, you fail to make proper distinction of causes. As a result of merely noting the existence of qualities in things, you fail to note the mode of their existence in them,—a thing of the greatest importance is the direction of causes. Heat certainly exists both in fire and in hot water, but in fire it exists *per se*, in water *per aliud*. Water, being naturally cold, grows hot when compelled to do so by fire, and assumes a quality contrary to itself.

Hence it is in a way a considerable task for the fire thus to affect the water with its own quality; it heats a smaller quantity more easily than a large one; and if to the heated water a quantity which has not been so heated is added, the heat seems to leave it as though in a fit of temper, and gradually withdraws its strength; hence the temperature of the water falls. No inference can be drawn from the one case to the other, and therefore your ill-chosen analogy cannot have any bearing on the matter. Now that you have learnt something about the qualities of things you will recognise the soundness of what I have said.

NEPHEW: You are careful to leave part of my question outside your argument; but I should like you also to recognise the stumbling-block in your own path. By all means let us grant that in the case of water a less heat added to a greater does not increase the intensity, water receiving this quality which is contrary to itself not *per se* but through the fire, and it being as you said, a harder task for the fire to change the greater quantity than the smaller; but why should air be similarly affected, I fail to see. Both the inner and the outer air are naturally warm, and become so not through force impressed upon them but by complexional quality, and therefore there is room for doubt as to why the one is cooled by the addition of the other.

ADELARD: As I see it is not easy to fool you, I will tell you

briefly what I really think about this. As you say, it is impossible to accept in the case of air the reason which holds good in the case of water. Perhaps, however, you will accept this one: though both airs are hot, yet the outer air gains less in temperature when fanning takes place, during which time, as a result of rebounding, the inner air is to some extent driven away from the surface, and the outer air takes its place: I am not now, you must understand, speaking about admixture or blending produced by the admixture, but about the repulsion of the inner air, and the taking of its place by the outer air. It would thus be the intention of the fanner to remove one, and to put the other in its place. Hence, whenever we find the heat too trying, in order the more quickly to remove the hot air we use the fan, so as to drive air straight into our faces, and in this way one air is at once got rid of, and the other takes its place.

CHAPTER XXXV.

WHY IT IS EASIER TO GULP DOWN VERY HOT FOOD THAN TO HOLD IT IN THE HAND (*sic*).

NEPHEW: Since this point is in my judgment satisfactorily explained, here is another I should like you to make clear: why it is easier to gulp down very hot food when we cannot hold it in the mouth?

ADELARD: As this is explained in the *Saturnalia* of Macrobius, and is also quite clear from what I have just said (that the interior is hotter than the exterior), I think we will put this question on one side, having, too, in our minds Terence's saying "not to slay the slain."

CHAPTER XXXVI.

WHY THE FINGERS ARE OF UNEQUAL LENGTH.

NEPHEW: Your explanation of why you will not answer the question contains in it sufficient to enlighten me on the point; and now, seeing that what concerns the head and face has been explained with sufficient probability, I think we should give a little attention to the composition of the hands; for in regard to these there is a matter about which I am not clear. Since equality is more to be desired than inequality—a fact suggested by the higher repute of one as compared with the other, let us discuss why the fingers are of unequal length.

ADELARD: I can see that I am talking to a mischievous fellow; but still the suggestion is not a bad one, and I will defer

to my questioner. I ascribe the cause of this inequality to the hollow and unequal shape of the hands; and we will therefore first settle the cause of this hollowness.

CHAPTER XXXVII.

WHY THE PALM OF THE HAND IS HOLLOW.

NEPHEW: Let our enquiry then first be why the inner surface of the hand is equally hollow.

ADELARD: The mind taking of course careful heed of its own advantage, considered that in this concavity there were provided vessels or containers for things taken hold of by the fingers; also is realised that its body would have a future need of drinking, and therefore deemed it advantageous to have in this same concavity a drinking-cup. Further, while with a view to the dignity of its nature, it wished that nothing should be wanting to it, at the same time it added to it nothing at all that was superfluous.

In order, therefore, that you may not have to look to outside sources for a drinking-cup, you have, let me tell you, one born as part of yourself, with which to supply adequately nature's need of water.

NEPHEW: Now that I understand about the advantage of the concavity of the palm, I shall be glad to hear about the unequal length of the fingers.

ADELARD: When you want to grip external things taken hold of by the fingers, it is, I suppose, necessary for the fingers to be closed. Now, as the palm is not equal, this same shutting of the fingers would be imperfect and useless, unless the fingers were also unequal. As this is a matter that each man can understand by a trial on himself, I think there is no need to say any more.

CHAPTER XXXVIII.

HOW IS IT THAT HUMAN BEINGS CANNOT WALK AS SOON AS BORN, WHILE BRUTES CAN?

NEPHEW: Enough: about these matters I will argue no more; I want instead to put to you quite a different question. It is indeed a common enough matter for discussion among ordinary folk, how it is that while most brutes can walk as soon as born, yet human beings, who ought to excel them, are found weak and lacking in this ability; this matter, since our object is a philosophical discussion of the composition of man, it will be no degradation for us to handle.

ADELARD: As our discussion has in its turn come down to a matter of ordinary common sense, if I am to answer your question, I should like to direct your attention both to the weakness of human limbs, and to the difficulty of walking upright, for from these two causes proceeds the impossibility of walking (*sc.* at birth).

NEPHEW: But why should there be this weakness of limb? And why this difficulty in walking upright?

ADELARD: Both alike arise from nature's dignity when acting as agent. By nature acting as agent I mean the mind. The more worthy the powers she proposes to exercise in the human body, the more suitable for these powers she makes the limbs, and therefore in no way bony, or capable of offensive action; for while such are suitable to the brutes, they are out of keeping with the practice of rational virtue. As being fleshy and therefore tender, they are in consonance with reason, and adapted for its activities; as being made of earthy clay, and therefore having a certain attraction to it, they may not degrade their governing principle to the earth; nature by raising them up has taken these precautions, and made it her plan, that they should never through contemplation of their own bodies fall away from reason. Since therefore neither the weakness of our legs, nor our manner of walking upright is causal, it results that there is nothing inconsistent in our early difficulty in walking; and just as in the case of brutes, the power of offence they have in their bodies pertains in no way to virtue, so nobility of limb in the early days of rational animals is not to be imputed to vice.

CHAPTER XXXIX.

WHY HUMAN BEINGS ARE REARED ON MILK.

NEPHEW: You have proved your point, and I give in; but there is another question I should like to put, and it is this:—How was it that parents at the beginning decided that milk was the proper food for their young? For, were it not that it made them gentler, it would seem cruel and inhuman to feed, as it were, on part of the mother. Let us then depart for a little from the subjects we have been discussing, and give to this one the attention it seems to deserve.

ADELARD: I explained at the very beginning of my book that like feeds on like. Let me now tell you further, that the limbs of the child in the womb are built up from the mother's menstrual blood. When the child has been born, this blood is no longer so employed, and is by the same providence turned into milk,

and thereby the child is after birth more suitably nourished. The human race, not unreasonably, follows this practice as a result either of the teaching of philosophers, or of its observation of the example of animals.

CHAPTER XL.

WHY MILK IS NOT SUITABLE TO PERSONS IN YOUTH OR OLD AGE.

NEPHEW: Unless it be that milk is unsuitable to youths, why should it be banned by almost all of them?

ADELARD: This is due partly to occupation, partly to age, and partly to training. Limbs that are formed require different food from limbs in process of formation. Infancy again requires one thing, and youth desires another; while, lastly, undeveloped jaws call for one sort of food, and fully grown teeth for another. Finally, I should not like to say that human milk is unsuited for any time of life, but only that it is unnatural.

CHAPTER XLI.

WHY IF YOU HAVE INTERCOURSE WITH A WOMAN AFTER SHE HAS LAIN WITH A LEPER, YOU WILL CATCH THE DISEASE, WHILE SHE WILL ESCAPE.

NEPHEW: I give in; and now that we are talking about human nature, there is another point in regard to it which should not, I think, be passed over in silence. Suppose a sound woman has intercourse with a man suffering from elephantiasis, how is it that not she, but the first man afterwards to have connection with her, will catch the disease?

ADELARD: The action of the contagion is matter for regret rather than for wonder; and if you want to understand its cause, you must first learn the properties of the two sexes. It is the nature of the male to be hotter, that of the female to be colder; the male leans towards dryness, the female towards moisture. Hence, if the female receives the seed of a leprous man, the cold and damp property in her protects her from infection; but since part of the seed remains inactive in her, when a healthy male approaches her, both his dryness and his heat increase, and from the likeness of qualities he becomes infected. Just as coldness and dampness repel, so warmth and dryness by their very nature attract.

CHAPTER XLII.

WHY WOMEN, THOUGH COLDER THAN MEN, ARE YET MORE WANTON.

NEPHEW: But if, as you say, a woman's nature is colder, why is she both by report and in actual fact more wanton?

ADELARD: More wanton she certainly is, but the reason is to be found not in her coldness but in her moistness. Badly tempered blood abounds in her; and as on account of her coldness it is impossible for her to temper it, it results that she desires to be purged of it by means of coition. Seed, you must know, is only blood changed into whiteness; further, being cold, the woman's aim is to be brought into contact with the heat of the male, just as serpents are led by their coldness to enter the mouths of sleepers; and that cold blood abounds in women is testified to by the menstrual purgation, a provision made by nature on this very ground. It is the case, therefore, that with the idea of thus purging herself, the woman feels the need of intercourse with the male; but it is not the case that she would become infected with elephantiasis as a result, unless she should either conceive, or during the embrace breathe in too much infected air, or, going outside her woman's nature, abound in heat.

NEPHEW: Everything you say makes me more anxious to hear the rest, for though they are not necessary truths, they are easy to understand, and, as they do no violence to possibility, probable.

ADELARD: That which cannot be rebutted is next door to a necessary truth.

CHAPTER XLIII.

THE REASON FOR THE UNIVERSALITY OF DEATH.

NEPHEW: By all means: and now since we have discussed sufficiently the living, I want to raise the question, how it is men come to die. I am not talking of those who die violent deaths, for in their case the reason is obvious enough; what I want to find out is, how it is that people die without suffering any open violence.

When we consider with what care the building up of the body has been worked at and accomplished by the mind, and that no closer union can be discovered than that of the mind and body, we may well ask how it is that the mind becomes changed and—willingly or unwillingly—abandons the body. But that it does not do so willingly (I am speaking only of what concerns nature) is shown by the pathetic manner of its exit from the body, to say nothing of the fear of death which we almost all

have. Since then it is in the midst of life that the mind goes forth, it is strange that it should do such grievous violence to nature, which is so powerful.

Ought so violent a departure to be ascribed to the Creator by whose order the mind entered the body? In that case, if it goes forth by his prompting, then just as its entry from Him is no matter for shame, so its departure to Him should not be unpleasant. Again, when the mind took it upon itself to leave its fleshly (*reading "carnale" for "cavaret"*) home, had it some reason in nature which made it do so? For, of a truth, if it were able to keep that which is perfectly finished and therefore perfect, it would have no reason; while it is easier to keep that which is perfect than to make something which is imperfect, when there is no lack of food to ensure that keeping. Further: since neither its own will, nor the power of its Creator, nor the compulsion of necessity separates these two well-matched things, why does not the union last for always?

ADELARD: Allow me to check the flood of your speech with a word or two.

NEPHEW: The importance of the question seems to me so great, that I cannot help taking pleasure in setting it forth.

ADELARD: Then you shall have the pleasure also of hearing the answer. It is as follows: in the first place, it was with reason as its guide that the rational mind entered this body we are now discussing. There are some bodies which are never quickened by mind, since it never enters them; and there are others, which it never abandons; but there are also some which it at one time stirs, and at another abandons. I think then that there is something in bodies which, when the mind finds there, makes it love them; and since it loves them, it quickens them: in others, there is something which it shuns, and therefore it does not visit them so as to stir them. What it loves is that which is congenial to itself, and what is congenial is necessarily that which by nature is like to it: it is therefore in the nature of things that it should love natural similitude. Now that which is like to it is whatever in a body is either equal to it, or nearest to equality with it; and it follows, therefore, that it is this equality that it loves. This equality we must look for in elemental composition, neither the fiery quality showing itself in excess, nor the heavy earthiness being entirely destroyed. Since the mind itself was made in equal proportions by that which is equal, how could it follow after inequality, inequality meaning, as it does, discord? The mind, therefore, by reason of its innate equality, requires an equal proportion of elements, or a proportion which approaches equality; and when it finds it, quickens it. Those bodies, therefore, which differ in themselves in equality of properties, it leaves unvisited:

this is, for instance, the unvarying condition of lamps and other articles of furniture; those which never depart from the equality of their composition, it never ceases to quicken, *e.g.*, the higher bodies and the coporeal stars. Other things, however, which sometimes approach equality, and at others recede from it, are sometimes animated, and at others abandoned by the mind: I mean, humanity and the other mortal animals.

CHAPTER XLIV.

WHY MAN, HAVING ONCE BEEN FORMED IN EQUAL PROPORTIONS, IS ROBBED OF THAT EQUALITY.

NEPHEW: Since, so far as I understand your meaning, the whole force of your explanation lies in equality of proportions, this point necessarily comes next:—How does it happen, that while when once you have made the qualities of this compound equal to the movements of the mind, you have gained an elemental peace—how, I say, has the breaking of so essential a union come about, the useless separation of so seemingly a combination?

ADELARD: A fair question, assuming that you understand its meaning. Give me your close attention, and I will answer as briefly as possible. It is a universal and admitted principle, that whatever by converting something else effects change, is itself also changed as a result of this operation. The axe changes the wood when it chops it, but is itself also changed by the wood; it becomes blunt; the knife changes the bread when it cuts it, but is itself changed in the process; it grows smaller. Whatever acts in this way on something else even though it is insensible, is yet acted upon by that on which it acts. Thus in the case of food, the living body acts upon it, for it changes it and alters its qualities; but conversely the food acts upon the body, changing its property, and overthrowing its equality; for though the qualities of the food are sensibly conquered by the qualities of the body, yet the power of that which conquers and its equality of composition are gradually lessened and overthrown by that which is conquered. Everyday life gives us abundant examples of this. Hence it happens, that the mind, while aiming at preserving its body by taking in food, without intending it, destroys while repairing, and while keeping, loses.

CHAPTER LXV.

WHY WE SHOULD NEED FOOD EITHER SO FREQUENTLY OR AT ALL.

NEPHEW: Why should this destructive restruction of our bodies by means of food be required, when they have once been created in good health?

ADELARD: It is a matter of necessity. Since each particular living creature does not contain all the parts of nature, and since also the external parts, *i.e.*, the elements, are stronger both in quantity and efficacy, it necessary follows that our interior parts are destroyed by the external ones, and hence, as there is continual destruction going on, there must also be a continual renewal.

Faced with the imminent danger of dissolution, the mind loses some part of what belongs to it, that it may gain more by way of renewal. It is a true proverb, that "he who will not give what he holds dear, will not get what he wants." Renewal, therefore, is the result of dissolution; and change of equality the result of renewal. It is to this change that the separation of the mind from the body is due. Your question, therefore, is now fully answered.

CHAPTER XLVI.

WHY THE LIVING ARE AFRAID OF THE BODIES OF THE DEAD.

NEPHEW: A clear explanation; I am no longer in doubt about this. Perhaps we might now discuss, why we who live fear the bodies of the dead? The dread is common to mankind, and I should like to enquire what hidden reason there is for this almost innate fear. You do not fear the dead body of a lion or a tiger. Why then do you shudder at a human corpse? While it lived and had the power to hurt, you were free from care and happy; but now that it lies inanimate you are frightened of it.

ADELARD: The Immutable Cause which created all things intended them to live, and therefore made innate in each and all as powerful a reason as possible for living; for He saw that the most effectual way of accomplishing this would be for them to love life, and hate death. This point I will explain more clearly when I come to treat of the reasons for existence. Meanwhile I should like you to grant that the love of life, and the hatred of its opposite, are innate.

NEPHEW: Why should I not, when Boethius has established this point by point in the "*Consolatio*," and on philosophical grounds?

ADELARD: For the present, then, let it be considered established that reasoning animals more than the others cleave to life, and shun the idea of its cessation. Now the animal is nothing more than the union of mind and body. The animal, therefore, loves the union of mind and body, and necessarily hates their separation. Consequently, he is bound to hate the result of this separa-

tion, which is an inanimate body. This therefore is hateful and horrible to a living animal; and this feeling is not due to the fear of harm, but to the natural scheme of the universe; for which reason I should like us to call this shrinking *hatred* rather than *fear*.

CHAPTER XLVII.

WHY IF A LIVING MAN FALLS INTO THE WATER, HE GOES TO THE BOTTOM, AND YET IF HE IS DROWNED COMES TO THE SURFACE AGAIN AFTER A FEW DAYS.

NEPHEW: Since here nature's scheme is not at variance with nature, let us pass on to the next matter. There is a further point in regard to the dead about which I am in doubt:—When a man falls alive into a river or the sea, his weight takes him to the bottom, yet after a few days he floats, a sorry sight, on the surface; and herein the force of nature seems to be changed.

ADELARD: It is rather your nature which is changed, you do not understand what you should. Since four humours constitute the human body, there are present in it the properties of the four elements. The one which is stronger than the fiery receives, encloses, and contains in the gall the warm and dry property; but that which is warm and dry is necessarily light, and that which is naturally light, unless kept imprisoned, naturally tends to rise higher. So long, therefore, as the vessel of the gall keeps the lightness of the body imprisoned, it is not able to raise the body. But when the prison is broken open, and the lightness spreads through the limbs, it then, through the necessary power of its quality, is able to rise higher, and in wretched fashion to raise those limbs.

NEPHEW: While I am setting forth all these questions for you to solve either by necessary or probable reason, it happens as a result of your method that I am more ready to accept your views than to cry out against them. You have now resolved my doubt in regard to humanity; and I think it will be of benefit both to me and others, if you will give your views about earth and water, and about air and fire.

ADELARD: Yes; since we have devoted the holiday to intellectual exercise, do you weave your riddles as much as you can, and I to the best of my ability will explain them, provided always that you do not require necessary truth of me—but that you accept what cannot be rebutted.

CHAPTER XLVIII.

HOW THE GLOBE IS SUPPORTED IN THE MIDDLE OF THE AIR.

NEPHEW: It is of these then that we must treat, of their position, movement, course, and other circumstances. I will put the first question that comes into my head: How is it that this earth of ours which supports all weights (I am speaking not of simples, but of compounds), how is it that it remains in the same place, or by what is it supported? If all heavy bodies, such as stone, wood, etc., require support, and cannot through their weight be supported by the air, then much more does the earth, which is heavier than everything else put together, require to be supported, nor can it be held in position by so unstable a body as the air. Hence it is contrary to reason that it should maintain its position.

ADELARD: Certainly it is inexpedient that it should fall, and that we also shall not fall along with it. I will show that its remaining in its position is in accordance with reason. From the character of its primary qualities, we know that the earth has weight; that which has weight is more secure in the lowest position; and everything is naturally fond of that which preserves its life, and tends towards that for which it has a liking. It follows therefore that everything which is earthy tends towards the lowest possible position. But in the case of anything round, it is clear that the middle and the lowest are the same, and therefore all earthy things tend towards the middle position. Now the middle position is a simple and indivisible middle point, and it is therefore clear that all earthy things tend towards a local and simple point. But this local point is not several but one, and must necessarily be occupied by one thing, not by several; but to it, as has been said, all things tend: consequently each one thing presses on something else, since all and sundry are hastening to the same point. Now the point to which all weighty bodies are hastening is that to which they are falling, for the fall of weighty bodies is merely a hastening to a middle point. By the point to which they are falling I mean the fixed middle point. The place to which they are falling—the middle point—remains fixed; and therefore, while falling into a stable position, they yet remain fixed, unless some force be impressed on them as a result of which they are diverted from their natural course. The very opposite then is the case to what you thought; and you will now see clearly that it is what you thought to be a reason for falling which gives stability and coherence to heavy bodies. They are, therefore, in some way supported by the point to which they are hastening; and if it should move in any direction, all the things which are affected towards it would also of necessity move,

though of course in that self-same spot we have not the first but the second cause of stability: for, in accordance with the reason previously given, the first cause of this equilibrium is the property of the subject, the second the stability of the point which it makes for.

CHAPTER XLIX.

IF A HOLE WERE MADE STRAIGHT THROUGH THE EARTH, IN WHAT DIRECTION WOULD A STONE THROWN INTO IT FALL?

NEPHEW: My next question is in no wise contrary to what has gone before; I see that this results from the mere coherence of things. My difficulty is this: Supposing the earth to be pierced, so that there were a passage straight through, and a stone be thrown in, what would be the direction of its fall?

ADELARD: That which causes the stationary position of the earth, would produce equilibrium in the stone.

NEPHEW: The answer satisfies me; for I understand that it would come to rest at the central point.

ADELARD: There is a further point I should like to make clear to you: as all nature loves its like, so it shuns the contrary. Fire is opposed to earth in the effective power of its qualities, and hence it follows that earth shuns fire. The whole of the upper space environing the world is the home of fire, and this upper space with its fire is therefore necessarily to be shunned by earth: but whatever flees from the central point will come into collision with that which it wants to avoid: therefore that it may not in unfortunate flight come into collision with that which it avoids, the earth seeks that point which is on all sides equally distant from the upper spaces. This position then it holds for two reasons, (1) through its own weight it seeks that for which it has a fondness, (2) because it shuns that which it does not like.

NEPHEW: If then, as explained by you, the centre and the lowest point are the same thing in the frame-work of the universe, how is that Statius, the poet (in this point, Statius the philosopher) has contrasted them; for he says, "Either the lowest part of the earth or its centre, both adjoin the hidden universe"; by thus separating them, he has adjudged them to be opposites.

ADELARD: He has a two-fold object to gain: he is both hinting at the falsity of vulgar and self-contradictory belief, and openly setting forth a physical truth; for the common herd do not distinguish between circumference and containing plans. Consequently, with confused minds they wrongly trust the eye, and wrongly invent an hemispherical imperfection; and, therefore,

from this stupid point of view the bottom of the earth will not be the centre. To right the mistake is, however, an easy task for the individual, and therefore outside the scope of the present treatise. It is now clear even to the unlearned that earth is both the bottom and the centre of this mundane mass.

CHAPTER L.

WHAT IS THE CAUSE OF EARTHQUAKES?

NEPHEW: It is plain that you do not plough the sea-shore, nor sow your seeds in the sand; you speak words of understanding. If indeed, as you explained above, heavy bodies have gained a central equilibrium for a double reason, what is it which makes them change from this causal necessity, and produces instability? You will not deny that you once told me, that while in the Antioch district you were crossing a bridge in a certain city, not only the bridge but the whole of the district was shaken by so violent an earthquake that you seemed to be in as great danger on land as by sea. What then is this power which is so violent that it changes the position of things and earth herself, that ponderous mother of weights, from the position she has taken? From a consideration of this point again you will no doubt find some qualitative cause; and yet if there is one, it will perhaps be contrary to the one previously mentioned, and so being false, be no cause at all.

ADELARD: Your anecdote is true, but your prophecy false. Just as I passed over the shaking bridge without a scratch, so I shall answer your question without damage to my consistency. In an earthquake the earth is affected particularly and not universally; and the cause of the movement I hold to be not its own quality, but the effect of its continent. By its continent, I mean the air; for the air is not only diffused all round the earth, but also fills its interior bowel-fashion. When, therefore, the outer air calls to the inner air, the latter hastens to go forth to its kin; and gathering together with this object, fills the caverns of the earth; and so long as it finds obstacles, shakes it violently, and does not rest till it finds its course outwards. No doubt it will be obvious to you, that while every such compound may be imprisoned for a time, yet at last it will strive to force its way to its original source.

CHAPTER LI.

WHY SEA-WATER IS SALT.

NEPHEW: Yes, that is quite clear. Let us, therefore, now

pass to the natures of various waters, in regard to which my first perplexity is why sea-water is bitter and salty?

ADELARD: I regard the heat of the sun and the planets as the cause of the saltiness. The real ocean flows through the torrid and centre zone, and it is through the same zone, though indirectly, that the planets have their course; and, as a result of the great heat of the stars, the sea itself is necessarily heated, and consequently becomes salty. A fact which supports this theory is, that in the sea-board districts near that ocean, sea-water when dried in the sun on the rocks is, without any artificial process, turned into salt; while in more distant seas, if you want to get salt, the sea-water as being remote from violent heat, and therefore less cooked, has to be subjected more than once to the action of fire. It has often been found also that even fresh water can be turned into salt by a process of cooking over fire; and to this we must add, that all sea-water is saltier in summer than in winter,—a fact that can easily be verified by experiment.

CHAPTER LII.

THE CAUSE OF THE EBB AND FLOW OF THE TIDES.

NEPHEW: Now that this has been settled, I think we might deal with another notorious difficulty—the ebb and flow of the tides, and whether the theory of some philosophers that they are due to a violent action, is to be accepted. These say, that the ocean proper flowing through hot channels causes streams of very great quantity to flow back from east and west into the Arctic and Ant-arctic regions. These flowing together with great violence produce, they say, the tides—the impact of conflict giving us the flow, and the recoil the ebb.

ADELARD: I would not dare to find fault with what philosophers say, but this much let me affirm confidently; that if, as they say, the waters in very big arms of the sea come together, when the waves are once mingled, there will be no second impact; for it is not possible that they should separate again; or at any rate, if they should a second time come into collision, the second one will be less than the first, and the third than the second, while later it will be very small, and finally nothing at all. I should like to know what answer your philosophers will make to this. Now let me briefly give my own explanation: I admit the recoils, and do not deny the meetings; but I do not admit (*condo*, in the original should be *concedo*, or its abbreviated form) that they flow together, or come into violent conflict. The reason for this I take to be the situation of the earth; for though the

channels of the sea are fiercely eager to meet one another and flow together, yet it happens through the interposition of mountains and the somewhat elevated situation of the earth that on their ebb they are drawn back from that particular course. The result is that they are held back by their position from the point to which they are impelled by their natural and inherited movement. I am not ignorant that there are those who say that this movement goes on in one sea, the Caribbean; but if this were true, there would be similar violent movement of no less strength in those seas which are nearer the torrid zone; while, as a matter of fact, all those seas are free from any agitation of the sort, and for this reason,—that they are far removed from the cause we have previously mentioned.

CHAPTER LIII.

WHY THE INFLOW OF THE RIVERS DOES NOT INCREASE THE SIZE OF THE OCEAN.

NEPHEW: Since it is agreed that nothing that is possible must be put aside, we must consider this next question. If, as the common herd declare, all rivers flow into the sea, it is strange, having regard to the great bulk of their waters, their constant flow, and their almost infinite number, that they do not swell the ocean's size.

ADELARD: If you follow the common herd you will tumble into a pit. They not only understand nature so badly as to be like men in a dream, but when they talk about her, positively snore. It is not true that all rivers run into the sea, though many do; and just as some run into it, so others rise out of it. Consequently, the sea gives as well as receives, and so gets no sensible increase. In the same way some people have raised the question why, seeing that many subterranean streams proceed from it, and the stars also drink up a great part of it, it does not decrease rather than increase. Hence we find in Statius, that Phœbus sings of "the spring that feeds the boundless main." As a matter of fact, the sea gives as much as it receives.

CHAPTER LIV.

WHY SOME RIVERS ARE NOT SALT.

NEPHEW: Lo! I am again befogged. If rivers run from the sea to us, how is it that they are not salt when they reach us?

ADELARD : That which they received, they lose on the road ; for though they were salt when they started, yet being, as it were, strained in their passage through the bowels of the earth, they leave their saltness there.

CHAPTER LV.

HOW RIVERS CAN HAVE A CONSTANT FLOW.

NEPHEW : Now that we have made mention of rivers, if we regard them carefully, we shall find ground for perplexity : how is it that they maintain a constant flow? How are we to account for the fact, that the flow of water was not exhausted long ago? Water follows water in endless success, and the long procession never ends, this entire arrangement going on to infinity.

ADELARD : He who is ignorant of beginnings speaks but ill of conclusions. I want you to understand that the movement is a circular one, without beginning and without end, and anything of which this is true is in a state of perpetual movement. Rivers, being running streams, have by natural means a continuous circular movement, and therefore return upon themselves : what they have lost by the outward movement, they regain by the return. Hence it is that the satirist, mocking the stolidity of the vulgar, says, "The bumpkin stands waiting till the stream has flowed past; but it glides on, in its rolling course for all time." Do you, therefore, who just now bumpkin-fashion were waiting for the end of the ever-flowing stream, now that you have been instructed, return to the ship of wisdom, in order that you may cross the river.

CHAPTER LVI.

WHY SPRINGS ARE FOUND ON HIGH GROUND.

NEPHEW : We now know all about those streams which either run round and round in orbicular fashion, or which flow into the sea, and then, flowing out of it again, are unfailing. Concerning those springs, however, which have their origin on high mountains, I am quite at a loss as to what is the reasonable view to hold. Since the circumjacent plain is open on all sides, I see that no river can climb up to them, and fail to understand how they originate.

ADELARD : Listen spell-bound, and understand. Since in the bowels of the earth rivers divide their courses in many ways, it may happen that a stream may enter ground which is blocked by

obstacles on all sides, and is therefore compelled to flow out upwards, if such an exit exists : continually rising, it is bound to come to the surface,—a thing which you can see exemplified even in works built by man for holding water.

CHAPTER LVII.

WHETHER SUCH THINGS AS REAL SPRINGS EXIST.

NEPHEW : If, therefore, in the case of water-courses we assume this reciprocal motion of which you speak, and believe that they run back upon themselves, we shall have to admit that there is not of necessity such a thing as a "spring," and the word will be a mere empty name without substance; while if we admit according to the ancient idea that they do exist, what reason are we to give for their perennial springing? Would the earth itself in which they spring be lacking?

ADELARD : I cannot deny that your question deserves a reasoned answer. True, those waters which return upon themselves cannot be called springs, and it is yet asserted that there are genuine springs. We must consequently discuss the cause of perennial springing. Let us treat the matter in a common-sense way, and call in the help of analogy. To my idea, a spring in moist ground is much the same as drops of sweat when your body is perspiring. As the earth becomes subject to moisture in many different ways, it gives it out and breathes it forth through a quality inherent in it, when the moisture coming together from different places collects into one, and thus we get a spring started; and as this spot continues to generate moisture, the big drop, of perspiration as it were, becomes a spring; and hence it happens, that in places where the moisture is small, the spring dries up in summer, while it flows vigorously in winter.

CHAPTER LVIII.

WHY, IF A VESSEL BE FULL AND ITS LOWER PART OPEN, WATER WILL NOT FLOW FROM IT UNLESS THE UPPER LID BE FIRST REMOVED.

NEPHEW : There is another point in which I am in doubt about the nature of water. As you know, some little time past we visited an old witch in order to study magic, and there attracted by her sense, or perhaps her nonsense, we spent some days. In the house was a vessel of remarkable powers, which was brought out at meal-times. Both at top and bottom it was pierced with

many holes; and when water for washing the hands had been put into it, so long as the servant kept the upper holes closed by putting his thumb over them, no water came out of the lower holes: but as soon as he removed his thumb, there was at once an abundant flow of water for the benefit of us who were standing round. This seemed to me to be the effect of magic; and I said, "What wonder that the old woman is a sovereign enchantress, when her man-slave can work such wonders!" You, however, though according to your habit you paid great attention to enchantments, refused to regard this as magic. Now tell me what you think about this matter of the water: the lower holes were always open, and yet it was only at the water-carrier's will that water issued from them.

ADELARD: If it was magic, it was nature's rather than the servant's power. The body of this sensible universe is composed of four elements; they are so closely bound together by natural affection, that just as none of them would exist without the other, so no place either is, or could be, empty of them. Hence it happens, that as soon as one of them leaves its position, another immediately takes its place; nor is this again able to leave its position, until another which it regards with special affection is able to succeed it. When, therefore, the entrance is closed to that which is to come in, in vain will the exit be open for the departing element: thanks to this loving waiting, it will be all in vain that you open an exit for the water, unless you give an entrance to the air. These elements, as I have said, are not pure, and are so closely conjoined together, that they neither can nor will exist without one another. Hence it happens that if there be no opening in the upper part of the vessel, and an opening be made at the lower end, it is only after an interval, and with a sort of murmuring, that the liquid comes forth. The quantity of air which comes in is equal to that of the water which goes out; and the air finding the water porous, passes through it, thanks to its natural tenuity and lightness, and takes possession of the apparently empty upper part of the vessel.

CHAPTER LIX.

HOW WINDS ARISE.

NEPHEW: As regards water, you have said enough to satisfy my doubts. Such questions as why some of them taste of saltpetre, or others grow hot of themselves, have been more or less well handled by others, and there is no need for us to discuss them now: let us then go on from our present point to others

of higher importance. We have dealt with water: now let us discuss the nature of air. Doubting with Statius, who, in his poem on Nature, asks, What is the provender of the winds? I ask whence comes the winds?

ADELARD: In my opinion, the wind rises partly from the surface of the earth, partly from the expanse of waters. Marshes and valleys give up a great deal of dense air, which in the natural course of things rises upwards; further, when they are loosened, they give back to its natural position much moisture of water which they had previously held imprisoned: add to this that I do not exclude from my statement the actual air which is the continent of earth. In order that the subject of our enquiry may be more easily understood, I will give a comprehensive definition of it. Wind then is air in a state of motion, and dense enough to have propulsive force; for I think that wind is a species of air: in order, however, to separate it from moon, its superior genus, I add "dense." Since so long as it remains inactive it cannot be wind, I do not doubt that it must be in a state of motion: therefore I add "motion" to the definition: while, finally, to distinguish it from those dense airs which are in very gentle motion, the definition requires the addition of "propulsive force." Here, therefore, I collect both those airs which are dissolved in many ways by the lower ones, and also the continent air which surrounds us, if they have the previously determined differentias.

NEPHEW: I therefore will hasten on to my previous goal.

ADELARD: Be careful not to tumble in your haste.

CHAPTER LX.

WHAT IS THE ORIGINAL CAUSE OF THE MOVEMENT OF THE AIR?

NEPHEW: As you previously explained that wind is air in motion, it is necessary, if there is to be wind, that the air should be set in motion.

In regard then to this motion, let me assume an inactive state of air, in order that we may see whether any part of it can have the said state of motion. Whatever is moved is moved by something, and whatever derives motion from something else is moved either by something in a state of rest, or by something which is also in motion. Now it is impossible for a thing which is completely at rest to destroy the tranquillity of other things, and to urge them to motion. Therefore motion will be produced by something in which motion exists: but this thing in which motion exists must necessarily be set in motion by something else. But the number of "something elses" is infinite, and the

motion therefore of the air will be infinite: therefore there is either no such thing as wind, or if it has once happened to come into existence, it will both cause universal motion, and never reach its goal. Away then with this harmful definition which robs the world of its quiet, and produces an intolerable state of things!

ADELARD: The man who leaps before he looks will fall before he should. Look then at the subtle nature of things, and not at sophisticated stumbling-blocks. For just as I think existence to be the cause of variation, eternity of time, and unity of plurality, so I think rest to be the cause of motion. Whatever, however, moves, if the term is employed properly and in the sense of passivity, is certainly moved by something else; and you will admit that rest and motion have different meanings. Rest is the result of passivity, while motion leads to action, for a thing will move, and not itself be moved by something else. In form it will be active, not patient; it will be the cause of motion, not its effect. In fire, when it rises upwards, this cause, or form, is called lightness; in a stone, when it falls downward, gravity; and in fire let us call it agility, for this in fire, though itself quiescent, impels its foundation to motion. Motion, therefore, as defined will be neither infinite, nor will it land us in an unending search for causes. Let other people look to what they have said about motion; I, for my part, consider the forms of things to be the causes of passive effects; for these at times by their efficient power, which by likeness of nature calls out those of other compounds, impel the things on which they act to suffer divers effects, though they themselves undergo nothing of the sort. For this reason, the prime cause of all things, though in a sort it moves all things, is yet itself subject to no change; and therefore it does not follow, that because a thing produces movement, it is therefore in a state of movement.

CHAPTER LXI.

WHETHER WHEN ONE ATOM IS MOVED, ALL ARE MOVED; SINCE WHATEVER IS IN A STATE OF MOTION MOVES SOMETHING ELSE, THUS SETTING UP AN INFINITE MOVEMENT.

NEPHEW: It may be that in the case you have mentioned there is no movement, yet I am still perplexed. You cannot deny that whatever is in a state of motion moves something else. Now to be in a state of motion—that is, motion causing change of place—means leaving the place one was in and taking the place of something else, for whatever changes its place moves that

whose place it takes. It follows, then, that whatever is in a state of motion moves something else; and hence, if one atom of a body is moved, motion goes on *ad infinitum*. Therefore the movement of the winds, begin it as you may, will never come to an end.

ADELARD: Oh, yes it will, and I will show you how. I grant, of course, that whatever is in a state of motion moves something else. This movement, however, necessarily goes on not extensively nor *ad infinitum*, but orbicular, and returning to the point from which it started. The motion of the winds will be an orbicular one, resembling that of water, but not exactly so; at the same time it will be perennial. There will be something which, when a like form drives it forth, will give it a transverse impetus, and as a result the whole body of atoms in connection with it will be diverted from their previous course. Again, should that which, by a more powerful impulsion, has just diverted the one group of atoms from its course, come into contact afterwards with a still more powerful impulse of air coming from elsewhere, it will certainly be over-mastered by it. Consequently, if in different parts of the sensible world different movements are in the aforesaid manner produced, they will be bound to come into collision with one another, and are thus diverted from their original course; and in this way, so far as that particular arrangement is concerned, the impulsive power is brought to an end. Since then the original movements are brought to a stop by coming into contact with other movements, and the impulse of all does not follow the movement of any single one, no one movement of them all will go on perpetually, a thing which will be easily seen in the case of a ray of the sun.

CHAPTER LXII.

WHY WINDS TRAVEL ROUND THE EARTH, AND NOT IN AN UPWARD DIRECTION.

NEPHEW: Your answer is hard to understand, but as no self-contradiction can be found in it, I suppose it cannot be refuted, and shall prefer therefore to adduce other matters in regard to which I feel some perplexity. If, as you assert, it is because the similarity of what befalls them outwardly calls them forth, and their proper qualities urge them on, that such a body of airs is forced into motion, why do they not move upward, a thing which their very nature would seem to demand, rather than by sweeping along the earth, and cleaving to it, choose to abandon their natural home?

ADELARD: Little though you think it, it is by doing this especially that they keep to the order of things and the plan of nature. Just as that which through its abounding in fire is most light—I mean the æther—holds a position near the fire, so the wind, being weighed down by the heaviness of moisture, has its abiding-place near the water; the former is raised by its rarity, the latter depressed by its weight: one is elevated by heat, the other weighed down by the coldness inherent in moisture. Consequently, as it is bound to move and cannot rise, it courses round our earth, and troubles our peace.

CHAPTER LXIII.

WHY, OR WHENCE, IT GAINS ITS TREMENDOUS POWER?

NEPHEW: You have spoken well, for you have both spoken the truth and given me an opportunity of putting a fresh question, for I quite agree with what you have said about place and direction. My doubt is this: How has the wind such strength and such mighty power, that it is able to throw down houses, to root up trees, and destroy the repose of nature?

ADELARD: The causes of this destructive onrush are to be found in the world's wide speed and its stoutness of constitution. No small amount of air is imprisoned in the bowels of the earth, and for a long while is unable to come forth; as time goes on, however, either its own strength giving it the means, or the earth's established course opening a road to it, it manages to burst forth, and the longer it has remained shut up, the more violent will be its exit. If, in addition, it becomes of a stout constitution in the matter of density through an uncertain watery humour, this stoutness combined with swiftness produces propulsive force. In whatever direction, therefore, it moves, it does mischief proportionate to its strength; and it ought not, therefore, to seem strange that, in its struggles to break forth, it works changes upon the earth, and that in forcing out a way, it overwhelms the obstacles in its path.

CHAPTER LXIV.

WHENCE THUNDER PROCEEDS.

NEPHEW: One thing which clearly takes place in the air is an object of wonder to all nations—the death-dealing disturbance called thunder. By it not only are all nations terrified, but fear weighs heavily also upon irrational creatures: at the sound

of it, birds leave the air in fear, and seek their nests in the leaves, and the brutes, what we call their dens: the shell-fish of the sea, leaving the gems on which they are engaged unfinished, hasten to the bottom, abandoning their shells. Is, then, your science bold enough to give the cause and origin of thunder, or is it unable to solve this most difficult problem, for in face of thunder the philosopher is no braver than the rest?

ADELARD: Nothing is difficult, unless one loses heart. Hope on, and you will find the right road: so far as I can, I will explain this phenomenon. Let us start with something fixed and unquestionable. It is fixed and beyond doubt that mists rise from low altitudes to higher ones; this frequently happens, and our eyes bear witness to it. Now some of these are of slight texture, others dense, others denser, and others densest of all, and this in proportion to the amount of moisture each contains. If then the denser ones, when they rise, encounter a cold layer in the upper altitudes, they first turn into clouds: then, if they encounter the steady, cold and biting grip of arctic winds they are, from this two-fold cause, frozen into ice. This ice is kept firm by its own extent and cohesion, and supported unbroken by the air beneath it. If, however, head-winds swoop down on it with great violence, or if a summer waxing it is exposed to the solvent action of heat, it is then of necessity broken up by the former or melted by the latter. Thus being deprived of the support its size gave it, it can no longer maintain itself in the air, and falls: hence the thunder we hear in winter is due to the breakage of the ice, and what we hear in summer to its melting. The various accidents, then, which accompany this phenomena do not, taken separately, arouse your surprise: your eyes bear witness to the rise of clouds; the excessive coldness of high winds proves the freezing which takes place; while the crash which follows upon the collision with the winds proves to your ears that the clouds are either broken or dissolved. Why, then, should the sum total of accidents fill you with such wonder? Why are you amazed? Why perplexed? Why turn your wondering and uncertain eyes now this way, now that? Yet I know that the darkness from which you suffer afflicts all who are in doubt about the nature of things, and leads them into error. The mind imbued with wonder and a sense of unfamiliarity shudderingly contemplates from a distance effects without regard to causes, and so never shakes off its perplexity. Look more closely, take circumstances in their totality, set forth causes, and then you will not be surprised at effects. Do not be one of those who prefer ignorance to a close examination. In matters of this sort I have found almost all men wrong-headed; and hence, when I lay down premises of this sort in talking with them, they neither accept my

premises, nor listen to my explanations: they point me out with the finger, and make me the subject of scandal.

NEPHEW: I myself must admit that I find it difficult to fix my mind on causes: it is but too ready to turn to wonder at effects.

ADELARD: Then you are as bad as those of whom I have spoken.

NEPHEW: Not so much as you think; and I am quite ready to admit the truth of all you have been saying, if only you will further give me something like a probable explanation of the *essentia* of ice.

ADELARD: A fair request: consider then, and from the effect weigh the cause. Have you not frequently noticed the noise of hail following on thunder?

NEPHEW: Yes, we do not often have thunder without hail.

ADELARD: We have sometimes seen hail-storms so heavy that both brute beasts and human beings have perished in them. Ought not then what falls to be called pieces of ice rather than of hail, the fact being that, when large pieces of the upper ice have been broken off, they fall downwards in fragments, becoming smaller and smaller as they fall; and when at length they get down to the earth, if they find the lower air cold, they come down in the form of hail, while if the air is warm, they melt into rain? Hence it follows, that any such violent collision up above between wind and cloud is followed by hail or rain.

CHAPTER LXV.

THE CAUSE OF LIGHTNING.

NEPHEW: I think I understand this all right; but there is another difficulty I should be glad to have removed: What is the cause of lightning? True the question has been already raised by some, *e.g.*, by Statius, who says, "Then he discloses what it is that speeds the lightning"; but yet I do not remember that anyone has explained it adequately.

ADELARD: The matter is certainly worthy of discussion; and in order to make the force of my explanation quite clear, try to realise that as a result of all violent collision of bodies, the lightest thing in them is the first to be separated from them. Now of all sensible things fire is the lightest, and is therefore forced out of them by the violence of the collision. Never in this hall of the elements is there a bigger conflict than the fierce collision of the ice I spoke of, and hence fire of wondrous velocity necessarily shoots out from it.

CHAPTER LXVI.

WHY LIGHTNING DOES NOT ALWAYS ACCOMPANY THUNDER.

NEPHEW: I am afraid your "necessarily" breaks down badly, for a necessary consequence must be an invariable one; but we have often heard thunder which was not accompanied by lightning, just as you do not always perform what you threaten to do.

ADELARD: Kindly listen, in order that you may become clear of your mistake. When I used the word "necessity," I did not mean it universally, but meant simply the necessary cause of this particular effect; though I am bound to say that I think it seldom or never happens that thunder is not accompanied by lightning, even if not always of the fiery sort. Some lightnings, let me tell you, cleave, others cut, and others burn. It is a visual phenomenon which sometimes produces a stone called by the Greeks *kerainus*, and by the Romans a cleaving stone. Sometimes only air results from the thunder, and that is by some called "cutting lightning"; frequently also fire is hammered out from it. This, however, depends rather upon the nature of the forces that come into conflict than on their difference. If only winds clash together, they will produce dangerous air; but when masses of ice are forced together or melted, if the collision is a violent one, a stone forces its way out; if ultra-violent, then fire is produced.

WHAT IS THE FORCE BY VIRTUE OF WHICH LIGHTNING PENETRATES STRUCTURES OF STONE AND BRASS?

NEPHEW: Truly a monstrous offspring of evil generation, whether we are to call it air, or stone, or fire! For though so small in itself, it produces such grievous violence, that, sometimes by reason of the thickness of the clouds of which you talk, it cuts its way even to the earth, sometimes utterly destroying trees and buildings of wood, yea, even on occasion making its way through structures of stone and brass, and consuming them.

ADELARD: Whatever pierces obstacles does so rather by the speed it has acquired than by its own proper substance. Of so much greater account is velocity in matters of this sort than offensive power, that even with such poor tools as slender wooden missiles, without any iron tip whatever, we pierce the thickest shields. When we are settling what constitutes force, we must include velocity, and therefore also power of penetration. Here we have the answer to our question. In the case of all thunder, its downward speed is so great, that its "missibility," so to

speak, produces in itself so great a quantity of wind and so much penetrating power.

CHAPTER LXVIII.

HOW IT IS THAT IT IS NOT AT THE SAME TIME OR ALWAYS THAT WE HEAR THE CRASH OF THUNDER, WHEN WE SEE THE LIGHTNING.

NEPHEW : If, as you have said, the fire is the result of the crash, how is it that we often see the fire, and only subsequently, or not at all, are the crashes of thunder heard?

ADELARD : The fact that we do not immediately hear the cause when we see the effect, is to be referred not to the phenomena themselves, but to our hearing and the nature of our sight. These two senses are not of the same quickness of apprehension, as what I have said before will make clear. We can find an analogy in the case of sweetness in the sense of taste, which always makes less appeal to the old. It is as if a man from a high watch-tower on a mountain should observe a bandit in the valley below; the impression of what goes on will reach his sight before his hearing. The fact that sometimes we do not hear the crash afterwards is due to intervening objects: masses of clouds of great thickness intervene, and these more readily intercept the sound than obscure the brightness of the fire.

CHAPTER LXIX.

WHY THE MOON WAS DIMINISHED IN RESPECT OF LIGHT.

NEPHEW : Even though I hide the truth, I cannot resist it. By your explanation you have uprooted the thorns of perplexity from the field of my mind; so let us according to the terms of our agreement proceed to another question. You have given my ignorance milk from the breasts of reason; do you therefore, as though I were fastened by a halter, go on whithersoever you will, and I will follow. Just as when it is Socrates who preaches, virtue and friendship make things easy that are almost impossible, so does reason bring back an intelligence that was despaired of to clear-sighted deliberation. Let us then put on the wings of reason, and rise to the stars, first discussing the Moon as being the nearer to us: How is it that it alone of the great choir of stars lacks the charm of light of its own to such an extent, that it is only a fraction of itself, and that no fixed shape whatever has survived the injury it has received? The fact is, I am not yet clear as to whether the sensible universe was made from something else or from nothing: if from nothing, then just as the other

stars are perfect, so the moon might have been made perfect, lacking nothing. Whatever lacks existence is nothing; and therefore it may have been made from nothing, in that it was not made in like manner to the rest. Again, if the whole world of stars was made from something, it was made either from a sufficient material, or from something which could fall short of perfection: if it was from abundance, then nothing could be lacking to the moon; but if from stinted or insufficient material, why did not the other stars go short rather than the moon? If you consider the matter, it is certain that the stars were set up for the sake of mankind. Is, then, Saturn of greater benefit to us than the Moon? Is not the Moon, as being nearer to us, both more powerful in its effect, and pleasanter to look upon? It both controls the humours, and illumines our darkness.

ADELARD : You are trying to establish a dilemma; yet its horns are not so strong but that they can be, if not broken, at any rate bound. We will assume that the world is made either from something or not, and I grant you which alternative you please: if you like, this one,—that in the universe you see rather efficient cause than material. Hence a philosopher has said, "The workman gives fortune to the work, but the understanding of it belongs to the all-good Creator, whoever he be." If then he be such, it necessarily follows that everything must, like its Creator, be all-good. Nothing, therefore, can be better than it is; and if it changes, it must do so for the worse. But enough, and let our familiar conversation return to the matter in hand. You complain that the Moon is not perfect, and by "perfect" you mean round. But just consider what follows: If the moon were round, and always of the same form, it would have a light of its own. But this it has not, just as it has not always the same form and roundness. If, however, it had a light of its own, then it would also have fire of its own: having, however, no fire of its own, it also has not light. Now if it had fire of its own, the heat would be harmful to us, for it would wither the fruit, and dry up the springs, and, blazing away close to the earth, reduce it to dust. If there is much drought when the Sun is in Cancer, then if the Moon were every month in the same sign, wholesale destruction would follow. It was against this that the All-Wise and All-Good made provision.

CHAPTER LXX.

WHY A PERPETUAL SORT OF SHADOW BROODS OVER IT.

NEPHEW : In view of the impossibility I grant this; but as we have chanced to talk of the Moon, I want to bring forward a matter which perplexes me more than anything else. It is

this: How is it that a shadow which all can see, and a shadow of such intensity, broods over it? I am not raising the point as to why it suffers eclipse (many people have already dealt with that), but what I want to get at is this: How is it that, whether at the full or the wane, it is always accompanied by a certain obscurity, which is always formed in the same way? Even more than at this, I wonder why, though the sun exists in the same hemisphere, it does not dispel the moon's darkness; is it that it would do so, or would not, or cannot?

ADELARD: It has neither the will nor the power, and, as I think, for the following reasons: In the choice of positions, every animate object has chosen that which is adapted to its own abundance.

Now the lunar body has fallen lower than the other stars, and therefore must be considered earthy, watery, and airy, rather than fiery: and the essences alike of earth, water, and air, are generative of shadow. Consequently, the lunar body is necessarily involved in shadow; and this shadow, together with the thickness of its subject, if diffused equally throughout the whole body, would not be to any great extent receptive of clear light. As, therefore, density of material is necessary if it is to keep its position, and clearness of light is welcome to us who look for it, that neither of these things might be prejudicial to it, both density and shadow have been combined into one, for philosophers also have called the moon an "aerial earth." You will understand, then, that I do not agree with those who assert that this darkness comes to the moon from below; it is, in my opinion, rather a matter of essential necessity than of external accident. They say that the moon wanders just as much as the seven planets; but I think it is they rather than the stars that wander; for I believe that whatever is in them, or arises from them, is produced by provident reason.

CHAPTER LXXI.

WHY THE PLANETS, AND PARTICULARLY THE SUN, DO NOT KEEP TO THEIR COURSE THROUGH THE MIDDLE OF THE *aplanos* WITHOUT DEVIATION.

NEPHEW: I am reminded by what you have said about the wandering of the stars, which the Greeks call "planets," to make a complaint about all of them, but especially about the sun. What is the necessity for the obliquity we notice, and the occasion for the wandering, as it is called? I am not asking why their courses are contrary to the *aplanos*, but why they recede obliquely, no matter in what direction their courses lie. Not even you can

deny the deviations and returns of the planets; both winter and summer show them clearly. Perhaps you may want to put it down to the oblique circumference of their orbit, and say that the zodiac is sloped from Cancer to Capricorn; there is nothing in that for me to attack you. The puzzle is this—why is the line of the zodiac ill-defined, when it might have been drawn in a straight line through the middle of the hemisphere. There would then accrue no small gain to the human race: the unpleasant excesses of winter and summer would be wiped out; and the State, freed from the extremes of heat and cold, would be happy in the enjoyment of a kindly mean of temperature.

ADELARD: Do you really think so? Happy it could not be: just consider the result; and let me tell you, that when I am enquiring into reasons my principle is, when I gain nothing from the antecedent, to consider what follows from the consequent.

Consider, then, what would follow from your misconceived "gain." If the Zodiac and its stars followed a straight line through the æther, this would be the state of things: Living on the equinoctial line, as we call it, we should have an unchanging condition of climate without either winter or summer; and winter once gone, there would be no rotting of the seed, without which there would be no quickening of it: for no seed quickens except it first rot. Again, if summer were done away with, there would be no means of drying up excessive moisture; and that once lost, there would be no ripening of the crops. Let us hear no more then of your evil suggestion of a perpetual spring.

CHAPTER LXXII.

WHAT REASON OR NECESSITY MAKES THE COURSES OF THE STARS CONTRARY TO THE *aplanos*.

NEPHEW: What you have been saying makes me quite without reason remember the joys of spring; but I should now like to bring back our conversation to certain matters previously passed over in silence. What was the necessity or advantage which called aside the planets from their proper and natural orbit? Would it not have been more proper and more natural, and would it not have been easier to mark their course and ordering, if they revolved in the same circuit with their first beginning, the *aplanos*? Some people, I know, have said, but I do not approve of it, that they moderate the rapidity of the course of the remote sphere. What reason have we for believing in the moderating power? What does it matter to us whether there is reason or not to fear the beginning of such a course?

ADELARD: And yet it might bring about our destruction. While the upper *animalia*, i.e., the aplanos and the stars, being of perfect body and mind, are naturally mobile, we terrestrial animals, exposed as we are to the repeated action of the turbid dregs of nature, are necessarily to a certain extent fixed, and though we frequently lose the position of equilibrium, our natural promptings immediately bring us back to it. If, therefore, the courses of the remote sphere and of the stars immediately below it were the same, the whole air beneath them would be in a state of motion, and the violent motion of the whole would either impede or entangle us: as things are, however, the opposite course of the stars taking place in the region between us and the sphere, both they keep to their natural motion, and we are not robbed of the refreshment of repose.

CHAPTER LXXIII.

WHETHER THE STARS REALLY FALL WHEN THEY SEEM TO DO SO.

NEPHEW: I accept your explanation; and now I should like to hear about something that happened to me the other day. While you by night were marking and mapping out the constellations of Hyades and Pleiades, and counting their relative numbers, suddenly from out of their array there flashed forth a brightness, having the shape and likeness of a star. Leaving a track behind it, it travelled far from its original position. At first I thought it was one of the Pleiades which had become detached, but when I had brought back my inquisitive gaze to the constellation, and seen that it had suffered no loss of number, I was overcome with surprise.

ADELARD: Their courses through the heavens do not suffer them to fall like that; otherwise the sky would long ago have been bereft of the light of its stars.

NEPHEW: What then is it, which so closely resembling a star, and travelling through space, can suggest the form of a star to our wakeful, or rather watchful, eyes?

ADELARD: Quickly learnt is soon forgotten: when just now we were talking about thunder, we were led by reason to agree that fire is sometimes produced by the breakage of ice, and at others by the conflicts of the winds. The sparks which are seen to travel through the air are the offspring of the lower air and of winds; and if you ask sailors about them, you will find, that when they see anything of the sort they generally anticipate violent wind-storms. The reason why such sparks seem to issue from the body of a star is that, as the stars which cover the heaven are so near to one another, wherever fire takes place in

the lower air, it is wrongly imagined to issue from a star, which we are in the habit of thinking travels in the star-bearing medium in the same way as the planets. I do not want, however, to press this point too far, or to deny that flames of this sort are sometimes produced by the stars themselves: they are huge bodies; and travelling with the velocity they do, it sometimes happens, as a result of the violence of their speed, that the æther bursts into flame.

CHAPTER LXXIV.

WHETHER THE STARS ARE ANIMATE.

NEPHEW: My question is answered; and now, calling my mind to order again, I want to hear about a subject on which you touched previously, for when you were talking of the moon, you spoke of it as animate. Now though I may be a fool, I am not a forgetful one, and consequently I come back to the point: Do you regard the stars as being animate, or inanimate?

ADELARD: The man who calls them inanimate is in my opinion without a mind (*anima*) himself. The reasons which make me think them animate I derive partly from their position, partly from their composition, and partly also from their action. If this world of ours with its storms of hail, its ugly clouds, and its teeming darkness, must needs, as having the power, maintain reason and foresight, how much more must the ethereal expanse, free as it is from all defilement, be obedient to mind and reason! Furthermore, if in this dark world of ours that spot abounds more in philosophers which is free of the denser pollution, and enjoys a certain serenity of climate, with what confidence can anyone, unless quite mad, assert that the expanse of the heavens, which is free from all stain, in proportion to its remoteness from us, is destitute of the motion which mind bestows? Again, if there is not, and could not be, anything better among created things than Mind, is mind to be buried in darkness, and the place fittest for it to be deprived of that which, through likeness of nature, it eagerly demands? If that is so, the order of nature is indeed inverted, for contraries are joined together, and like made to quarrel with like. It is only a fool who can set up a confusion of this sort, and the Orderer of the universe is all-wise, and therefore has no sort of wish or power to destroy the natural order of things, and it is therefore impossible that such an inversion should be. It is then out of all keeping that such an idea should come into the mind of a philosopher.

We must now consider the question of composition; for it is of no small importance in all reasoning to consider what is the

nature of the thing under discussion. We have to take for granted, rather than explain, the action of the efficient cause; and putting that on one side, there is nothing which shows consequent effects more clearly than the composition of the particular essence. I am talking of composition both in material and shape. Let us then, first, discuss the question of material.

Now the bodies of stars are composed in such proportions, that although they contain all four elements, they have a more abundant share in what is most adapted for life and reason; for they are fiery rather than terrestrial; and this fire, as Cleanthes proves, must be considered either destructive, like the fire of outer substances, or soothing and harmless, like the inner fire of our bodies. If, however, it were destructive, it would long ago have modified the shape of its subject, which would have become the cone-shape of external fire; but it does not act upon its subject, or produce a cone-shape, and is therefore not destructive but soothing and harmless: it is consequently obedient to sense and reason, and open to their action. As regards shape, what is there to say? Even the Latins realise that that of all shapes is best adapted to the action of mind, which the eye sees to be full and round. Next, we must take note of their action, in which we must accept not my view but Aristotle's, or rather what is my view because it is his.

Aristotle says, that whatever is in a state of motion is moved either by nature, by force, or by its own will. Now that which is moved by nature moves either upwards, as fire, or downwards as earth; but this is not the movement of the stars, which therefore are not moved by nature. Again, they are not moved by force, for what force could be greater than theirs? We must then put force on one side, and admit that they are moved spontaneously and voluntarily. But if they move spontaneously, it follows that they move with the motion of living beings—a view which I will prove against no matter what opposition, as follows:—If things which are in a state of motion sometimes come to rest, and at other times move, going sometimes backward and sometimes forward, then they are not moved by nature, for whatever is moved by nature neither comes to rest, nor changes its motion. It remains, therefore, that they are moved either by force or by will; now there is no force in nature more powerful than the turning force of the *aplanos*; but they are not moved by this, for they travel in the opposite direction. It follows, then, that they are moved by will, and the consequence of this is plain. Furthermore, if their action determines the life or death of the lower animals, there is only one view we can hold about them. When the Sun withdraws from Cancer and our region, vegetation

withers, and the joy of spring-tide bows its head in mourning, and presently the trees are bereft of the glory of their leaves. Finally, it is well known that many living things, not only terrestrial but those of the air, also die naturally in winter, and come to life again in summer. We must admit then that it is impossible to imagine that what produces life in others is itself devoid of life; only an irresponsible jester could say so. Further, it is certain that whatever observes a determinate arrangement and a fixed principle in its movement must employ reason; and nothing can have a more definite arrangement, or a more absolute order, than the course of the stars. When have the planets gone outside the zodiac? The Sun, when he has reached the extremity of Capricorn, checks his course and returns to us, just as he never goes outside Cancer. The case is just the same with the other stars; and there is therefore no difference between them and other rational creatures. Give then your most earnest attention to what follows: when things which but a little while ago started off and hastened away at full speed to Capricorn, return from it without the application of external force, they either know, or do not know, that they must return from it. If they do not know that they must return from it, why do they not go further instead of returning with such exactitude? If, on the other hand, they know, then they are endowed with knowledge; but to have knowledge without also having mind is impossible; and the stars are therefore animate, and possessors of reason and knowledge.

CHAPTER LXXV.

GRANTED THAT THE STARS ARE LIVING BEINGS, ON WHAT FOOD DO THEY LIVE?

NEPHEW: Thus far you have been so busy in heaping up reasons that I have not been able to get in a word. Your breath ran short long before your subject-matter; and now while you are getting your breath back, I must get my pipe into order again. If what you say is true, another question arises: All living creatures require some sort of sustenance; and if, as you maintain, the stars are living beings, what food do you assign to them?

ADELARD: Very good. Just as the stars are more divine in position, composition, shape, and reason than the lower animals, so also they have both the need and the ability to live on purer food than we do. They are attracted to higher things; and they therefore enjoy the moisture of the earth and water at a great

distance, but only in a rarified form; and while making use of them, are neither borne down by weight, nor dulled by them, to the loss of reason and foresight.

CHAPTER LXXVI.

UGHT WE TO REGARD THE *aplanos* AS AN INANIMATE BODY, OR A LIVING THING, OR A GOD?

NEPHEW: You have now provided me with a definite opinion about those matters which, in regard to the stars, seemed doubtful. What then do you think is the right point of view in regard to the *aplanos*, containing in itself as it does the shapes of all things? I have read many writings of many philosophers, and found in them very different opinions about the sphere which contains the whole universe. As these are all quite different, I do not think they can all be true; in fact, I am prepared to swear that they are all false. Some have been bold enough to say that the *aplanos* is inanimate, while others have maintained that it is animate, but not in the same way as a rational living being; others again—possessed either of deeper understanding, or else quite mad—have dared to call it a god. Which of these explanations commends itself to you is what I am anxious to learn, as I sit here.

ADELARD: It is understanding rather than sitting that is wanted, if you are to get a right view of the sphere of which we are talking. Just as it is unfitting to go down to one division of nature, so it is impossible to go up to another. A man of education—I say nothing about one who is not—would be ashamed to say that the sphere is inanimate, when the fact that it is animate is proved by the beauty of its outward form and shape, by the subtlety of its elemental composition, by its naturally holding the highest and therefore the noblest imaginable position, and finally by the indefatigable vitality of its orbicular motion and the indescribable velocity of its revolution. To say, however, that this same continent sphere is a god, is to speak in one way indeed as a philosopher, but in another as a madman. If we are speaking relatively to mere animal reason, then it must be granted that the *aplanos* is a god; but if relatively to God as the first cause, not made by hands, without form, unchangeable, and infinite, then to say that the outer sphere is a god is a profanation.

NEPHEW: Yes, to use the word in such a connection certainly is so. We agreed, however, at the beginning of our dis-

ussion to follow reason rather than authority; and, as we have so far followed the plan of beginning with more trifling matters and working upwards, we have now reached a point at which it becomes necessary to speak about God as the efficient cause of everything, for my knowledge is nothing unless I know about Him. To come to the point then: some people assert the existence of a God, while others deny it altogether. Of those who maintain His existence, some say that He is material, others form, others the universe, others the *aplanos*, while some again say that the Sun is God. I am therefore particularly anxious to hear from you, with reason only as our guide, and no sort of deference to authority, whether God exists or does not exist, what He is, and what He does.

ADELARD: You are putting a difficult question to me: I find it easier to prove what He is not, than what He is. In such matters I find it less difficult to confute the false than to prove the true; for when we come to talk about God, we have to treat of mind (?), . . . of simple forms and elements in the pure state; and just as much as these by their innate simpleness transcend the nature of all compounds, so much discussion about them transcends all other discussion both in subtlety of understanding and difficulty of language. We have already spoken at some length about compounds; and now that the evening suggests sleep, let us refresh our minds with natural repose, and in the morning—if your will still holds good—let us meet again, and discuss the beginning or beginnings.

NEPHEW: Nothing could please me better. To instruct my mind about God, whom we acknowledge to be the glorious Father of all things, and to speak about Him wisely, is for me, who do not admit authority, most difficult. It will, therefore, be most useful to discuss this and the concomitant questions, in which the multitude of counsellors has produced much confusion. Gladly then shall I accept the refreshment of sleep, that we may come fresh to a fresh discussion.

Ended are the *Natural Questions* of Adelard of Bath.
Praise be to God and the Virgin Mary!

Let him who would of things the hidden causes know,
See me, who can with ease their interpretation show.



Emendations and Errata:—

- On pp. 2 and 36 (Heb.) in **מח** between **למה** and **וצאו** *insert* [א].
- On pp. 5 and 52 (Eng.) in XLVIII. after the word 'water' *read* (not).
- On p. xiii, for 'souffiet' *read* 'soufflet.'
- On p. xx, line 15 from foot, for "חול *read* ח'ל'.

ספר דודי ונכדי

שאלות והשונות בחכמה הטבע

ר' ברכיה בר ר' נטרונאי הנקדן.

הוצאתו לאור כפי כתב יד הנמצא בעיר מינכען וכ"י בדלואי' באוקספורד
עם הרגום ומבוא ארוך בלשון אנגלית והוספתו אליו הרגום בלשון אנגלית
משפת רומי להספר מהסופר אדילרד מעיר באמה (Bath) הנקרא "קושיות
טבעיות" אשר עליו מיוסד הספר דודי ונכדי

היום המכונה דר' הערמן גאללאנטי.

מהבר ספר החיבור וספר המצדק וכו'.

לאנדאן

שנת צלוח המר דודי לוי לפ"ק.

בדפוס י. גרוניצקי, מ"ח דרך טייל ענר, מרח לונדון.



למוזכרת אהבה ולברכה.

מנחה היא שלוחה לאדוני אחי אשר נפשו קשורה בנפשי,
החכם הנודע דוקטור ופרופיסור בליטראטורה האנגלית

השר ישראל גאללאנין

ינון שמו עדי עד

2002
פירס (3/9) 850

זה הספר הנקרא דודי ונכדי.

- פה אתחיל בעזרת השם יתעלה לרשום הסמנים מהספר הנקרא דודי ונכדי הקושיות ששאל הנכד לדודו, ואתחיל בכאן שאלה ראשונה:
- למה כשהאיש נופל במים צלול הוא כעופרת, וכשמת היא צף על המים, ההפך הוא? (א = 42)
- למה נתלה הארץ באמצע האויר, ואיך תעמוד? (ב = 48)
- אם תנקב הארץ, אנה תפול האבן הנזרק? (ג = 49)
- למה הארץ מזדעזע? (ד = 50)
- למה מי הים מלוחים? (ה = 51)
- למה (מי) הים מתפשט בהרבה מקומות, והוך שעה חוו' למקום? (ו = 52)
- למה סמים כבירים לא יגדל הים הגדול, והלא כל הנחלים הולכים אל הים, והים איננו מלא? (ז = 53)
- למה הנחלים בשובם מהים לא נכר בהם מעם מלח? (ח = 54)
- איך יגדל כל נחל ונחל ולא יחסרו? (ט = 55)
- על הנחלים ההולכים אל הים, למה לא ימעמו? (י)
- מדוע צומחים העשבים שלא נורעו? (יא = 1)
- למה נקראו עשבים כאשר נצמחו בעפר יותר מכאש? (יב = 2)
- למה לא יצמחו העשבים באויר או במים או באש, הד' מוסדות? (יג = 4)
- למה העץ הנרבע באילן יוציא פרי כמו השורק ולא כמו השורש, שהוא גדולו מן הארץ? (יד)
- למה יש בהמה מעלת גרה? (טו = 7)
- למה כל מעלה גרה כאשר ישכבו יכרעו מפאת עגבותיה וברגליהם אחרונים? (טז = 8)
- למה לא ישתין העוף? (יז = 10)
- דודי, למה יש בהמות רואין בלילה, ויש שאינן רואות? (יח = 12)
- אם יש לבהמות נשמה או סברא? (יט = 13)
- ידענו כי קרנים לשור הנקראים כלי זיינו, ולחזיר שנים, ולאריה פרפותיו: יש לבהמות קצת להם כלי הברחה להיות קלים לברוח מרודפיהם, והם רגליהם, כאיילים וכשפנים וארנבים, אך לאנשים נתן בוראם יתירה על כל אלה:
- למה יש ערום שוכח, ויש לפעמים שומה זכרו (זכר. ל)? (כא = 17)
- איך נודע הכרת הרפו (הרפוס. ל), והוכרו, והמשפמ? (כב = 18)
- למה החיטם על הפה? (כג = 19)
- למה מפאת פניו ימרם הראש? (כד)
- למה הקול ישמע באוני אנשים הרבה? (כה = 21)

- 22 = נו) למה ישמע הקול מעבר לחומה, ולא תראה?
- נו) למה יראה העין מכל האיברים שבאדם?
- 24 = כח) אם הנשימה ממשות או דמיון?
- = כט) למה העין תשלום למה לראות הככבים ולמשוך [וגו']?
- ל) למה הנשמה מקבלת הראייה?
- לא) למה לא יוכל הרואה לראות פרצוף בזוכית?
- לב) למה העומד בחשך אינו נראה?
- לג) למה אין העינים לאחורי הראש?
- 31 = לד) למה האף מריח, והחיד מטעם, והיד מטשמש?
- 32 = לה) למה יבכה האדם בעת שמחתו?
- 33 = לו) למה ספה (אחד) אחר יצא קור וחום?
- 34 = לז) למה ינשבו בפני אדם לקדר חומו?
- לח) איך יוכל הגרון לסכול חום יותר מהפה?
- 31 (X) = לט) למה אין האצבעות שוות?
- 32 (X) = מ) למה לא ילך הילד מיד?
- 33 = מא) למה האדם יגדל תחילה מחלב אמו?
- 41 = מב) למה האיש מתנוע (מתנועע ל) בשכיבת [האשה]?
- 42 = מג) למה שנשים קרות מתאוות לאיש יותר מהאיש להם?
- 43 = מד) למה יפרד אדם מחיותו וימות?
- מה) למה השבע יתאב לאכול בזמן מועט?
- 46 = מו) למה החי ירא מפני המט?
- מו) מאין יבאו מים חמים (חיים) ויצאו מן הנהר?
- מח = מט) למה יצאו הסים מכלי מנוקב אם יסתום פיו?
- 59 = מט) מאין יבאו הרוחות?
- 60 = נ) מאין יבוא נדנור ראשון הרוח?
- 61 = נא) לדעת אם דבר קטון (קנה אם) יניד אחרים, כי המניד אינינו רק?
- נב) מאין יבא שבת השקט הרוח?
- 62 = נג) למה הרוח מנשב סביב היישוב יותר מסביב הרקיע?
- 63 = נד) מאין חוזק לרוח להשמיע קול?
- נה) ואת מליצת הרוד והנכר:
- 64 = נו) מאין יצא הקול והרעם?
- נז) מאין יצא הקרח הנקרא „גריילא“ אחר הקולות?
- 65 = נח) מאין יבא להט אש וברק בעת הרעם?
- נט) מאין יבא שדופות אש אחר הרעם, ולמה אינו נופלת תריר?
- 67 = ס) מאין יבא חוזק הרעם וברד לנקוב שום דבר?
- 68 = סא) למה לא ישמע קול הרעם קודם ראיית האור?
- 69 = סב) למה הלבנה תחסר מסללתה?

א.

פה אשר ברור מלל, יוציא יקר מוולל, ואמרותיו ללכי נכספות, וזולתי צנומות דקות ושדופות. מדי יום יום ארוזה צמאי מדברי פיו: ועתה אדוני, הודיעני למה האיש שנפל במים צולל כעופרת, וכשמת צף? כי הפך הדבר, כי היה לנו לחשוב שכבר המת סן החי: ויען לו, כי דבר קשה תחת מגריפותיך עכש, מגויית האריה רדה דבש: אמנם נכדי לפי שאילתך, ואת הלוייה בתולדות, בכליותי תשתונן כל חיים: יש לו להזכיר תולדת החי, וכאשר אינך מכיר עתה יאמרו שתולדותיך מוחלפת: הלא ידעת כי ארבע השרשים מיוסדים, אש, אויר, מים, ועפר, הן בגוף, וכל אחד לפי תולדתו הם חם, ויבש קר, ולח: וכל דבר הוא מתולדת האש שהוא חם ויבש: והחום והיובש של גוף האדם נסגרו תוך המריה, וכל חום ויובש דרכם לנמות למעלה לפי כוחם ותולדותם, כי הם ממתכונת קל: אך שהחום והיובש מסוגרים בתיבתם שהוא המררה, היינו הקלות נסגרות מכלי תת דרך לצוף על פני המים לאברי האדם: ובענין שתפתח (ב) תיבתם על דרך ותשבר על המבוע, וזהו המררה, אשר תבקע על הכבד שהוא מקור הדם, או תצא משם החום והיובש להתפור: בכל האברים, והקלות היוצא מהם הפזור בכל מקום הגוף אל האברים, ותנשאו:

ב.

דודי, הנה אמרתי בלבי לממון שגופי (סעיפי ל) לבלתי לשום עוד מצחי נגד מצחק, פן בשאלתי אסריחך: ועוד סבותי לבי ליאש, בתוכי תבקר אש, בלשוני להוסיף לקח, למה נתלה הארץ באמצע האויר, ואיך תעמוד? כי סובלת כל משא עולה (עליה ל) בעצים וכאבנים, שאין להם משען רק ממה (ממנה ל), כי האויר לא תשען, כי היא כבידה בתולדותיה יותר מהם, ועוד האויר סובב כל הרוחות: אם תאמר שאין מעמדה מן האויר או הארץ נופלת, מה שלא יתכן לומר לצי מראית העין: ויען דודי, אשיבך לפי מראה משפט הלבבות ולא לפי מראה משפט העין: ואתה בין תבין, למה יאמר עוד שהארץ תיפול? אם היתה בה סבת נפילה היינו נופלים עמה, אך תולה ארץ על בלימה, ונטע בלבינו שכל לדעת שהארץ כבידה לפי ראשי תולדותיה ומוסדתה: וכל דבר יש לו תועלת לנמות להולדותו שהוא מקום השפל ויאהב, כי כל דבר אוהב תולדתו וניטה להיות מעמד עם דבר שיאהב: על כן תולדות העפר נופה

למקום השפל, ומהו מקום השפל זהו הנקודה (הנקודה ל.) הנקראת כוף הנבול, לפי שאין דבר תחתיה: כי הארץ אשר תחשוב שהיא מתחת הנקודה, אם יוכל אדם ללכת שם עליה, יהיו רגליו כנגד רגלי הולכי הארץ שאנחנו עליה באמצע עינול הארץ הנעשה ככדור: ואותה נקודה היא בלא פרידה, ומעמדה במקום אחד, וכל הנעשה שהוא מתולדותה יבא לנקודה אמצעית: ואחרי שהיא מאחות מתולדותה ולא מרולדה (מובדלת ל.) ומיפרדת, על כן כל דבר אליה לסהר סרוב כוכב, שמה יפלו הנפיל (יפול הנופל ל.) היא מן הכובד היא המהירות לרדת במקום השפל שהיא הנקודה שהיא עומדת ובמקום יעמדו לא יתפרדו אם לא בחוץ יפירדם מצבתם, כאבנים לחצוב, וכעצים לחטוב, וכמיני מהכות, לפי שמנקודה והלאה לא יחשוב ממעל לה, ונקודה תולדותה להטות אליה כל כובד: ועתה תראה שאין בה סבת נפילה, והדבר שחשבת שיש בה סבה נפילה, והיא הנותנת מעמד לכל כובד כאשר ימצאו: אבל עלילה וסיבה ראשונה ממעמדה אינה מתולדותיה, אך עלילה וסיבה שנייה שהיא סדר הנצמד עליה, והיא מעמד במקום השפל האהוב שאין מקום השפל ממנה, ולא תטה אנה ואנה שהיא באמצע הארץ: והכבדים והמאירות שתולדותיה הטה ימשכו בשוה לחלוותיה החילתן ותולדותן, על כן ימשכו בשוה מארבע רוחות:

ג.

אם תנשב הארץ, אנה תפול אבן הנורק?
 ויאמר הנכד, הבנתי קצת דברך, אך לפי מאמריך הודיעני, אם מקום שפל שהיא הנקודה הנעשית ככדור תינשב עד תחתיה, שיוכל הרואה לראות מאויר שעל הארץ עד לאויר שנראה לו שהוא מתחת לארץ, וישליך באותו נקב אבן, אנה יפול וינח:

ויען דודו, הנהו מצב ומעמד לנודד הארץ, יניח האבן ולא יעבור הנקב:

ויען הנכד אין זה, אך האבן יניח באמצע מענה (מעבה ל.) הארץ, כן מצאתי בספר חכמי התולדות, אך לא אדע למה:
 ויען, נכונו דבריו, ואני אשכילך למה, ואז תדע מעמד הארץ וסודה ונחת האבן ואנה: הנה פעמים רבות שמעת, כי כל האוהב תולדתו בורח מאד ממנו שאינו תולדתו: על כן האש דרכו להנשא למעלה כאשר הוא ממהכונת עליונה, ויברח מן העפר שהוא הפוך בתולדותו, וכל השוה לו ינשאו למעלה כאשר הם מתולדותיו: והנה הנראה לך אמצע הארץ, בשתנשב אותו מקום לכדו מתולדת אחרת מתנודת, כי אין בה רק

מהכונת העפר לבדו, ומתחילת הנקב העליון עד מקום המוצא ממוסך ממחברת ארבע השרשים המוסדות: וכן מקום האמצעי ולמטה עד הכלית הארץ, כן מעורב וממוסך מן האויר שתחת לו שהוא בן הד' המוסדות: ע"כ אם יורקו אבן בנקב הכדור שהוא אמצע, שמה תנוח באמצעית כאשר המקום ממוסך ממהכונת עפר לבדו: ולמעלה מאותו מקום לא יניח, מפני תולדות האש אשר תברח ממנה מפני שאינה מתולדתה: וכמו שאויר שהוא ממעל לארץ לא יוצא האבן מפני שזה שמעורב בה תולדת האש, כן לא תרד האבן הנורק ולא תעבור אלא למקום האוחז מעפר לבדו, ושמה תנוח באמצע, האחה, בעבור כבירה מבקשת דבר שתאהב, והראייה השנייה, תברח ממה שהוא שונא, והוא דבר קל, וזה האויר המתייחס עליו, על כן תנוח ותעמוד במקום שתאהב:

ד.

למה הארץ מתרעוע?

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שיקוי לעצמותי ולבשרי הרופה, כמים קרים על נפש עייפה, אמרוותיך לכל מבינים, ומשך חכמה מפנינים: ועתה הגר, למה הארץ מודעוע, כי אמרת בעבור שני סבות, דבר כבד ומצא מנוח, ולמה הכבד מן הכבדים י'וע?

ויאמר דודו, אם לשוני בין מבעה, ואין אוזן שומעת, הנני כורע אל הקוצים, ומושך ידו למהלוצים, ושואל חכמה סרוב, ולא יגיע הדברים אל לבו:

ויאמר נכדו כן הוא, הנה אוני הגיעו אל לבי, אך לפי דברייך יקימנו: כי באוני אמרת, בעוביך בארץ כוש על הנשר נהק מעמד רגליך, ונהרפת ממצבך, בועזוע הנשר וברעד הארץ אשר עמידיה יהפלצון, וכל הממלכה סביב, עד כי אמרו יושבי הארץ, העדיף שוכן על ביב: על כן הגר לי, מאין תצא הסבה להודעוע דבר הכבד בארץ, אשר היא משען לכל כבדים, אלמא תמצא מנוח?

ויען דודו ויאמר, כאשר אמנם הנני אשר עברתי הנשר, והנשר רעד ונפל אתי, וקסתי ואתעודד לנפשי להניד סבה הרעד והויעזוע: אך חלק אחר מן הארץ יזוע ולא כולה, ולא מתולדות תצא הועזוע, רק מן האויר הסובב לכל עבריה תמיד ולא ינוח: ולפעמים נמצא הרוח בנקרת הארץ חוג (חגוי ל.) סלע ונכנס בה, ולא ינוח עד אשר ימצא יציאה לשוב לתולדתו שהוא האויר ולא יוכל, ולפעמים יעמדו נגדו דברים קשים, עצים ואדמה ביש', ומתחזק לצאת, ומניד הארץ ומרעדה:

ואני כרכיה מצאתי בספר החכם אבן עזר ובספר פרחון על המבים לארץ ותרעה, כי אוצרות הרוח בקרב הארץ, ו[מ]שם יצאו לכל העולם, וכשהיה האדמה רכה יצאו בנחת, והוא שנאמר ואר יעלה מן הארץ, להעשות עבים ונהפך למים, וכשתהיה האדמה יבישה וקשה וחזקה, יצא הרוח בחוזק וזרעיד בארץ, והוא סימן לבני מקום, וגולים ממקומם ותחלף המלכות:

ישמח לב יש(ל)יג נבוחות, לעברים ולשפחות ולקרחות ולגבחות, והיה לצמיתות נמכר, שומע בין ולא נזכר, ונפשי לא תקצר מעשות כלבי אוצר אל המדע ואל השכל כי תן לי ואוכל:

ה.

ועתה הגד לי, למה מי הים מלוחים?

ויען הדוד, כי בעלילת המלח שבים הגדול, בעבור שהוא רחב וארוך ומקבל כח החום השמש בעברו תחתיה: והוא גדול ורחב ידים לקבל כח החום כאשר הוא תמיד עומד נגדו, ובחוםם הופכים המים להיות עבים אם היו צלולים, ומחוםם ועובם הפכו למעם מלח; ואם לא האמין לדבר זה, שאל נא העמים הקרובים לים, ויאמרו כי בלא עשוי אדם ימצאו מן המים הנשארים מלח על צחיחי סלע אשר מקום נגד השמש והככבים: ואם תשאל לרחוקים מן המקום ההוא אשר לא כנגד חום השמש לא ראו במקומם כזאת, ולא יעשה להם כי אם בהכרחת אש וזרורה גדולה: עוד תשוב תראה, כי גם מים יעשו מלח ע"י חום האש: ואם לא תאמין לרברי, שאל ותמצא שמי הים מלוחים בימות החמה כככל יום בעת הקור, ואם כן מליחותן בא על ידי החום:

ו.

שאלה, למה הים מתפשט בהרכה מקימות, ובתוך שעה חוזר למקומו? נלצל כינתך לא נרוץ, כן ירבה ויפרוץ, ומדלי מוימותיך אשאב, כאשר אתה לחכמים אב: ועתה דורי, הנה ראיתי בספר הבא מארץ כוש ובא לפני חכמי תבור וכתבו בו, למה מי הים הולך ושב? והנה לך פתשגן כתב הספר: הסכימו חכמי ערב, כי ים הגדול, אשר המים נופלים בו, סוכב כל ארץ הישוב הנעשית ככדור: וידוע לכל שהיישוב נחלק לשלשה חלקים, וירושלים הוא טבור הארץ, וממנה והלאה מצרים כוש וארץ החתים וכו', וכל זה חלק אחד הנקרא מתצית הכדור, שהוא ארץ היישוב, והנה מחצית הכדור הנשארת לשני חלקי יישוב: והים הגדול שולח שתי זרועות השטף אשר ישטפו ממנו ראשו האחר ממורת ומסילתה למערב, ונכנס לאורך

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היישוב ללכת למערב, והשני למזרח: ויתפרדו אלה שתי הזרועות, ומעט הים וירד מאד עד אשר יפגעו שתי הזרועות זה בזה, ובמקום פגיעתן שמה ירומו המים ויקומו נד אחד וירתחו כסיר במצולה, ויהמו שאון גלים, כי כל אחד ירצה ללכת המים להאשר התחיל, ויהדוף זה את זה להיות ניגר במרוצתו, ומכת הפגיעה וההדיפה אשר יהחוק זה לעומת זה מכה זה את זה מכה גדול ושאון גדול, ומכת המכה ישובו על עקיבם, כאשר באו כן ישובו המים להתפשט אנה ואנה, וכה מתפשט כל המים: ועתה הודיעני אם דעתך הסכימה על זאת? בזה אומר אחרי זה אשר הסכימו חכמים לדבר זה, אך אם הייתי לפנייהם הייתי מהווכח עמהם, אם יצדקו בעיניהם, פי ירשיע עליהם בשני דברים, האחד, כי פגיעת המים זה בזה לא ישוב לא זה ולא זה, אך יתערבו ביחד בנחת בלי הדיפה, השני, אם אודה להם לדבריהם כי מכת הדיפה והפגיעה תגדל ההכאה המיד במים, עד שיחורו זה במסילה אשר בא וזה במסילה אשר בא, אם אומר בקלון כבודי להודות לדבריהם, אם תגדל ההכאה מן פגיעת שני הזרועות הים, השנית תהא חלושה מן הראשונה, והשלישית מן השניה, עד אשר דחיפית הששית לא לעזור ולא להועיל, ומי יאמין לדבר זה, כי בארבע דחיפות או בחמש תתפשט הים לחזור באורך היישוב, חלילה חלילה: אך פגיעת הזרועות לחכמים ידועות, ומיעוט הים ונידולו לא בעבור דבר [זה]: והעולה על רוחי אנידך, כי מתכונת ארץ ובעמדה ובמעלות ובמורדות שבהם עלילה הים מתמעטת לעת סרבית בשתי זרועות ים הגדול הסיוב היישוב ככנפים ביישוב כאשר ביארתי ממורה למערב: והנה כל דבר לחכמים דרכו להתפשט כפי יכולתו ולהיות ניגר, ולא יוכל לעבור המקום ההוא מפני גובהו, כן הים ומהלכו בניחו מרחב להתהלך כמרחב ארץ, וילך עד אשר יגיע במקום גבוה אשר יהיה בריח ודלתים לומר לו, עד פה תבא ולא תוסיף, ופה תשים גאון גליך, ושבים עד אשר תשפיל הים מאד, ושם ימצאו סבת חזרתם לרדת בנקעה הסמוכה, ויפלו המים לעומק לשוב לתולדותם ראשונה: הנה הגרתי לך דעתי, אמנם לחכמים שטעתי אומרים כי עת מיעוט הים ועת רבות הליוה בכח הלבנה, אשר היא נבורה על הלוחית כאשר השמש על החום, ולפי שיש כ"ד שעות ביום ובלילה ביום כשישלב בו ש'צ'ם ח'נ'כ'ל' שלשה פעמים ביום, והנה ללבנה ג' פעמים למשלת לכל הפחות, ובעת ממשלתה הגביר על המים כחפצה, ובהעלותם ובעת ממשלתם ימעיט: וזה לא רחוק בעיני כאשר אני רואה בכל ראשי חדשים, וי"א במסע הככבים ובהתחברם, ואשר חכמים יגידו, סעיפי לך לא כחרו, אחרי אשר מוימותיך מן הים לא קצרה, נחפשה דרכינו ונחקורה:

ה' 27

Star earth
= Capri octet

לשון

§ 53

ז.

למה לא סמים כבירים שוטפים יגדל הם הגדול, והכל הנחלים ההולכים אל הים, והים איננו מלא, כאשר אין קץ לידע מספר כל הנחלים ההולכים בו ?

ויען דודו, נכדי איש חכם בעיניו, והחכמה אזור במתניו, אך כל ימיו ושנותיו לא להראות ולהוכיח אל בכגדיו (לא ל ידיו ?), כי כל הנהרות הולכים אל הים, אם לא כאשר אמר החכם קהלת, וכמו שזה לא יוכל להראות באמת, כן לא יוכל להוכיח שקצת נחלים לא ילכו אל הים: על כן יש לנו לדעת שכמו שקצת נחלים ילכו אל הים, כן יש לנו לומר כי קצת מסנו יוולדו, כבולעו כך פולטו: אך לזאת יחרר לבי ופליאה נשגבה, בלכת הנחלים אל הים ובשוכם כאשר נדו, על כי הם נגרים מתחת לארץ ונבלעים בו מחום השמש והכבבים, וקצת מהם ככל עת: ואיך יקרה זה, שמוה לא(ל) יבא פחה אל הים למעטו? אך זאת נחמתי, כי זה דרך תולדת הים להשיב מה שבא בתוכה, ובעינין זה נקרא חיות להים:

ח.

§ 54

ויען נכדו ויאמר, זאת אל לבי אשיב, ואיש תבונה ידלנה: אם אמרנו שהנחלים ישובו מן הים, למה לא נכר בהם טעם מלח אשר מצאו בים בהתערבם יחד, כי מהוקים הלכו שם ומתוקים שבו? על כן אין להאמין ששם נבלעו, ועקבותיהם לא נודעו:

ויען דודו, פתאום בחוסר בין לחכמים יקושו, ומרדה בינתם מעליהם ימושו, כאשר לא ידעו ולא יבינו דרך התולדות אשר לנבונים נמדדה, ובמאפל סכלות נבוננו ובחשיכה יתהלכו: כי אתה אמרת לא יהיה הדבר ולא יבא, כאשר אינך יודע במראה העין אשר חכמים יגידו: והנה אני נשפט אותך על אוסרך כי זה בסכלותך, כי מתוקים ישובו המים למקומם הראשון: ואל תתמה על החפץ, בשיבם מן הים ונגררים במעבה הארץ, ונקו הארמה אשר ילכי כבירות המלח להעביר עד אשר יצלל כעופרת, והעפרוריה אל יעכב מלהים ויעבך עם אלכסנדרוס כאשר עבר הים הגדול ולא תדע את מתוקתם: ואם היית עם אלכסנדרוס כאשר עבר הים הגדול ולא הזקיך לך לחקור על זה, כי אריסטו מלומד רבו ציוה להביא חול מארץ לא מליחה, ושם תל גדול בצוי אדיר אשר עברו בו שם, וכרה לו באר בחול ההוא, והיה בעת שחסר לו משקים ולא יוכלו לשתות סמי הים בעבור מלחם, ולקחו סמי הים וישליכם בכאר, וישובו המים למתוקים: וזה לא נעלם עתה ממלחי הים באפיקי:

מ.

§ 55

איך יגדל כל נחל ונחל ולא יחסרו ?

דברי חכמים כדרכונות, על כן אכתוב לי ספר זכרונות, אכתוב אמריך לזכרון, ועתה אהנה בס לבי ירון: אם בסופה ואת והב, נאמנים פצע אוהב, ולעביר כי נכנס בשער יבא עתה עד תכליתם, ונחקור את תכונתן, מאין יבא כל שפע מכל נחל ונחל להיות ניגר תמיה, ומים אחד מים מיום שנברא העולם לא יחסר המוג:

ויען דודו, אם ידעת ראשיתו תבוא עד תכונתו, כי אי שלא ראש וסוף בדבר העיגול, וזה הדבר אשר אתה שואל אי סמי הנחלים עיגולם מהם? ואם נראה לעינים כי בהליכתן יגרו בשוכם בעיגול הארץ כן יולו תמיה, והנה הליכתם סכת תשובתם: והנה חכם אחד הלך בדרך וימצא כפרי אשר על שפת הנהר יושב ומצפה, והעת עת נשמים וקול רעם גדול, יאמר לו החכם, למה תעסוד בחוץ ולא תלך עד הגבול אשר חשבת, מושב פתאים ישבת? ויען לו הכפרי ויאמר, ברעתי היה לעבור זה המעבר, ואני מצפה עד שיעברו המים: ויען החכם, אתה סמתין דבר הסובב, שם תשב עד מות: והנה אתה נכדי, דמיתך לכפרי: עד כאן דברי החכמים:

י.

כל הנחלים ההולכים אל הים, למה לא ימעטו ?

הנה כתבתי לך מה ברעת החכם, אכן נודע על זה אשר בפסוק, כל הנחלים (ה)הולכים אל הים, לפי שהם יורדים, כי תנועת המים למטה כמו תנועת הארץ, הפוך האש והרוח: והעד על דברי שהים למטה מן הארץ, שכתוב בו הקורא למי הים וישפכם, שיעלו אל הר נבוה ואח"כ ישפכם: ועוד כתיב, יורדי הים באניות: והמעס איננו מלא, כי מי הנחלים מתוקים, והם קלים סמי הים שהם מלוחים וכבדים: בכואם אל הים יעלו כאור בעבור כח אור השמש והמשרתיו וגם צבא השמים, וגם ישובו בעננים וישפכם על הר ויתאספו בהר, והם סקור המעינות והם סקור הנחלים ישובו אל מקום שהלכו שם בתחילה: הלא תמצא וייבש הנחל כי לא היה נשם על הארץ? ואם תתמה על אשר לא הזכיר קהלת דברי הנחלים כשוכם, הלא גם לא הזכיר איך השמש הולך מתחת, אך חכמי התולדות לברם אלה דברי אבן עזרא:

ועתה אשיב ללמליצת חכמים, אשר לאנשי הדור נעלמים: דודי, הנכון במחניהם, ומלא רימון כל זמניך, וסעיפי מושכים בשבט סופר את היוצא מפיך בעין הלכות על המים בעיגול, ואשר מן הים ישובו: ועתה עמך

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לבי מרעיד יום או יומים, ויהי סבדיל בין מים למים, לדעת כל תכונותם: ובהגיע מחשבי על המעינות והמקורות והנמצאים, פלצות בעהתני עד ארוני מה ידבר בהם: ולזאת יחרר ויתר לבי בראותי ארץ שוה, ועמק הנגב סביבות ההר, וארץ צמיאה למים, וההר גבוה ותלול ובו יוצאים מעינות, אמרתי מאין יבוא? או גם כי אין מים בתחתית ההר? ואם מים היו שם בו איכה יעלו שם? ויען לו, סעיפי בלבך העל, לדעת המקור מארץ המשור (המישור ל). ועל ההר סמעות, רפאות היא לשרך, שיח לארץ ותורך, כי בחק ארץ המישור יתפזרו מקורות המים במסילות מופרדות ללכת אנה ואנה, כמים המוגרים באורך ישפשתו (יתפשמו ל) לארץ לרוחב: ולפעמים יקרה להם פגע לבא בנקרת הארץ, אשר סביבותיה אבנים ודבר קשה וממעל ארץ רפה חופפים ומתרפקים, ולא יוכלו להפשט עוד בעבור שהצורים קשים, או ירומו להנשא למעלה וכן יוכלו: כי רכה הארץ ממעל עד אשר ימצאו בראש ההר ובמסילה אשר עתה יעשו בהם, וזה משפסם כל הימים, ובפעולת האדם במוימות החבלותיו תוכל לדעת זה אשר יעשה אותם לעלות אל ראש ההר ממיל או חצי מיל: זו תשובת הדוד, לנכד, ורעת אכן עזרא כתבתו לך למעלה:

כאן אתחיל ספר השאלות נכד לדוד:

אני ברכיה בר נמרונאי, לחצוני רעיוני, אשנס מוהני להעתיק אלה הדברים בלשון עברית, כי מצאתי במכתב של גוים אשר העתיקום מן העבריים (העבריים ל) ובהם דברים נעלמו מחכמי דורינו וחכמות מפוארות למשכילים לא שזפתם עין סכלים: ובראותי חכמה מפואר' בלי (בכלי ל) מכוער לפניכם מוחזרים (sic) מהרתים מיד בן נכד וכתב[ת]ים בלשון הקודש אשר נעלה על לשון: והספר הזה הוא בין שני חכמי הדוד והנכד, לצרף וללבן מליצותם, שנאמר ואיש יהרפנו (יחרפנו or) רעהו, והמשכילים יבינו:

יא

מדוע יצמח צמח שלא נזרע?

דודי דודי, ונר הדודי, ידעתי כל חכמה ועצה יפוצו מעיינותיך חוצה, להשכילני על העשבים ועל השיחים: כי כל בלתי יחוו משאות שוא ומדוחים, ואני שאלתי לרבים מדוע צומחים העשבים שלא נזרעו, ואנה תשובתם, כי דרך אורחותיך בלעו? ואתה אדוני, ישמע על פיך: אם הקשית לשאול, נכדי, עפעפיך יישירו ננדי, כי בו הבין והפוך עורף, החוק בי ואל תרף לקרוע ענן סכלות מלבך, ואחר השחק מאשר

היום עכבך: ממני וממך יתבררו שאילתך על אמיתי, ועל אודותיך יתברך ויתעלה עושה פלא, אשר גזר ופעל כאלה: על כן יחפז יעשה להצמיח מוצץ העשבים אשר יצמחו בלא עזר האדם, מהם לטוב ומהם לרע, עליו להוסיף וממנו אין לנרע: אוסנס בתולדות העשבים יצמחו ארבע דברים הנקראים ארבע מוסדות אשר בגוף האדם, קור וחום יבש ולח, ובה אש ומים ועפר ורוח, ויש מכנה ארבע שרשים: וזה נלוי וידוע לכל חכמים כי בעשבים נמצאו ארבע מוסדות בפעולתם, אם לא נמצא בהם בסראית העין: כן בארץ אשר אנחנו עליה, אשר העשבים צומחים ממנה, ממוסכת ומורכבת מ' מוסדות הנזכרים ואם לא נראה רק בה מהמוסדות והוא עפר, וזה ידעו ונחנו החכמים הפילוסופים הראשונים: וכן האש הנמצא המים, והאוויר הנראה לנו, כולם ממוסכים יסודתם כל אחד נקרא לבדו על שם דבר הנראה והנמצא בו יותר, וכן כלם: כי הארץ נקרא על שם הנמצא בה עפרורית יותר משאר ג' המוסדות הנשארים, וכן המים, וכן האש, וכן האויר, על שם הנראה בהם יותר: ואתה להעמיק שאילה אנה ואיפא ימצא מבע העפר לבדו, והאש לבדו, והמים לבדם, וכן בדבר אשיבך על זה, בתוך חיק העפר אשר אנחנו עליה העפר לבדו בלי מסך שאר ג' חלקים, והיא הנקודה הנקראת סוף הנבל, שהיא מתולדת אחרת ולא מופרדת: וכן במים בתוך המים חלק המים לבדם, וכן באויר חלק האויר לבדו בלי מסך (מסך ל) שאר חלקים, וכן באש, והם במקורות כינותם: אך סוף דבר הכל נשמע, כי באדמה המוציאה רשא ועשבים ארבע הנזכרים: ויש לנו לדעת כי העשב בעודה דקה בתוך הארץ יולידה ויצמיחהו ארבע המוסדות, אדמת עפר תשרש ורנביה ורבקיה היא לך חיק העפר: חום יראיבוה (ירטיבנה ל) בלחלוחית ויפורנה אנה ואנה בתוך חיק הארץ ובמעכה האדמה: ותולדות אש ואויר דרכם להנשא למעלה, ויוציאוה כל אחד לפי תולדתו, האש חם ויבש, והאויר קר ולח, מאלה השנים תנדל, ותצא חוץ לארץ: והכלל כי לא תוכל לקום מלבד תולדת העפר, כי נראית יותר עיקר תולדותם מן הארץ וכחם: ועל זה הדרך יארע צמחון העשב בלי זרע: כזה עזרת ולא בת, דודי, לנגדך פקח כח (פקחח ל) להוציא לאור דבריך, דברי ריבות בשעריך, באמרם כי עיקר העשבים והולדתם מן העפר יותר מן האש? אבל [אם] כן, למה זאת העשב חמה בתולדותה, ויש אחרת קרה? לפי דבריך חלק הגדול צמחת העשבים מן העפר שהיא קרה ויבישה, על כן יש לנו לקרוא את שמותם קרות יותר מחמות כאשר אמרת באונך, כי בארץ ארבע מוסדות, ונקרא על שם העפר לפי שנראה בה יותר, ולא על שם רוח ואש ומים:

למה נקראו העשבים חמין? ושאלה השנית, למה נקראו עשבים כאשר נצמחו בעפר יותר מבאש?

ויען, כי אחותי תמוץ עליך מלתי, וזה הדבר לא נעלם מחכמה אשר תולדות העשבים מן העפר ממן (ממין ל). האש לפי שמקום צמחותם מן העפר, על כן תשאל ממני אחרי אשר הם מתולדת הקר שהיא עפר, איך תראה בה תולדת החום שהיא האש יותר? ועתה אשובך גם על זה: בכל דבר יש בו שני דברים, האחד יקרא גדול והשני גבורה, ואם הדבר שהוא הגוף נקרא על שם הגדול יחלק לדבר אחר ויקרא על שם הגבורה: ותבין משל ומליצה, אולי ללכך ונרמה לכך: הני סרבלי ירוק, וכמכעתי אבן ירוקה: הירוק שבסרבלי כירוק שבמכעתי, אכן תולדת האבן וגבורתו תעדיף ותתגבר (וההגבר) על הירוק שבכנדה, לפי שהירוק שבאבן בא לה מדרך תולדה, והירוק שבסרבלי נקל נגדו בגבורה, לפי שהיא מוכרח על ידי אדם לשנותו מתולדתו הראשונה: ואם השית לנשות לראות גוף הבגד שהוא הגדול, יראה לך שהבגד ירוק מן האבן, באשר גופו גדול מגוף האבן, ואם לפי התולדה והגבורה תראה האבן ירוקה מן האבן (ואם לפי התולדה והגבורה תראה ירוקה מן הבגד): גם העשב, אם תשים לפי הגדול שהיא מקום צמחונם תאמר שהוא קרה, ואם לפי התולדה שהוחמו האש (האש) האמר שהיא חמה, כי לא מגוף העפר ניכר האש כאשר חשבת, אני (sic) (אבל ל). עיקר צמחונם מן העפר, כי תולדות האש רכה: אם קמן הוא בעיניך, יעדיף על ארבע מוסדות, ותפתח ותכיר ותחקור העפר להראות בה גבורתו, על כן נקרא חמה:

ויאמר הנכד, על זה יוחמו (יחור ל) איך הצמחים יתבררו זה לקור, וזה לחום וזה ליובש, וזה ללחה, אחר אשר מעפר אחד יצמחו והיא הארבה, אשר הגורים לועזים אותה מניקתה, והעברים אם כל חי, והכותים אם גופות, וידוע לכל כי כל דבר גדל ופורה בדבר שהוא מטבעו ומתולדתו, ונשחה ונחבל בדבר שאין מתולדתו ומטבעו, ואיך העשבים אילו על אילו משונות לקור ולחום וליובש וללח וגדולן במקום אחד, ותודה לי שהי מקי' ממין אחד ומתולדה אחד, מה שאינו יכול ולא יתכן: ויען, עתה אנסה אם יש לך לב, כי אשובך בלשון קצר בתחבולות העשבים, אין להם גידול מגוף הפרי: ויאמר נכדו, כל זה אינו שוה לך כאשר אני רואה אשר מן הארץ ינתק רטוב הוא לפני שמש בעודו בארץ, ועתה כציץ יצא ואיו, קראתי לארבה, אם העשב המחויקתהו כרטובו ובלחלוהו, כי כאשר יצא ממנה אשר היא יומו (אמו ל) יזקין שרשו וימות נעזו:

ויען דודו, איני מודה כי העשב תצא מן הארבה אשר היא לכרה מנ' מוסדות הנזכרים, אך מן הארבה תצמח המוסוכת מד' מוסדות כאשר הגדתיך, כל אחד לפי גבורתו לקור ויחום וליובש [ו]ללח: הלוא תוכל לראות למה לא נבראו העשבים באויר? כי באויר ימות: החמה מייבש כל ציץ, וכל שורש, וכל עשב אשר חוץ מן העפר: וכל אשר בחיק הארץ כילד האוחז שדי אמו, ויגדל בהם, ולא במהרה ייבש: עתה הגדתיך די להשכיל אשר בין חובב, ואש נבוב ילבב:

ויאמר נכדו, אחר אשר כה הביאותני, עד סוף דבר תשלכני (תשכילני ל) כי נקשרות בעבותות השאלות, בעוד אשר אלך אורחות עקלקלות, ותועה מדרך תכינה, ולי עליך התלונה:

ויען לו, חלילה לי מרשע, אם אתה מקריי (מחקרי ל) חבין בפשע, כי כל אשר נברא בדבר הנזר על פיו, וכל מעשיו בצדק, אשר ישכילו המשיכילים, לכל תנועות הככבים המשתנות בכל עת ישתנו העכות והצמחים, כי הם תלויים בשמש ובגשם ירחים לחום ולקור: ובהשוכתי פצו כל שכולים, ותרע אשר לא ירעת, ואו תמצא אם ינעת: ויאמר אם רוחך תשים באפי, גם אני לא אחשוך פי, לא אשב לבמלה: הגד אם ידעת כולה כאשר אמתי, כי העשבים נבראו מן הארץ אשר בה ארבע המוסדות: ואם כדביך, למה לא יצמחו באור (באויר ל) או במים, או באש, הר' מוסדות: נכדי, הלא זה דברי אשר אמתי, כי כל דבר יפדה ויפרח ויגדל כמטבעו כמו העשבים, ויש להם גידול יותר מן העפר משאר המוסדות: ויאמר לו נכדו הלא ראיתי ציץ אשר יציץ במים, איכה יתפרדו ארבע המוסדות ממנו, ואנה ילכו? ויען לו, כי נזר כי כל אחד יפנה לדרכו בדרך אשר באו, בא עפר לעפר, ואש לאש, ומים למים, ורוח לרוח: ויאמר, עוד זאת השיבני, הנה ראינו במראה העין כי העפר, והו הארץ, תוליד ותצמיח דבר מטבעו כמו העשבים, עתה תשכילני אם שאר המוסדות יולידו ויצמיחו, כמו האש והמים והאויר: ויען, כי המצא כי המים ישרצו נפש חיה היא הדגה, והאויר הנקרא גוף יגדל עננים, האויר הגדל צורה הנקראת לילית שתדיר במים חרב, והאש תגדל עוף הנקרא סלמנריר: וכן הסכימו חכמי התולדות, והנה זאת חק-ניהו כן היא שמענהו: ועתה לך, דודי וידידי, על העשבים מצאה ידי, מאיזה מעם הם חמים, ולמה מארץ יצמחו, ומאיזה מעם יחיו, ולמה מארץ יעמרו יותר משאר מוסדות, ולמה ימותו:

יד.

למה העץ הנרכב כאילן יוצא פרי כמו השורק ולא כמו השורש שהוא גידולו מן הארץ?

עתה השבילני על האילנות ותולדות, כי עליהם מקור שכלי נסתם: למה עץ הנרכב בעץ יוציא פרי כמו השורק, ולא כסין השורש שהוא גידולו מן הארץ, ושרשיו ברוחב ובאורך, ואיך יגנוד זה בתולדתו הראשונה לעווב לקטן ממנו כחו לשאת פרי למינו?

נכדי, אחרי אשר עלית במעלת השכל, מי יעלים ממך כל דבר? אכן אתן לחכם ויחכם: דע לך, כי צמיחת האילן אשר הוא (בו ל) השורק, כאשר יכרת לא יתנשא עוד להתגדל באשר ראשי יונקותיו נקטפו, אך בחזק ובלחלוחית השורק המורכב בו יגדל ברוטבו ובזיבו, והשורש אשר יוציא להללוחית מן הארסה (לא) יעכב מה שצריך לו ויעווב לשורק את המותר, כמו החוסם נפש כל חי המעכב מה שצריך וממציא לשאר אברים מה שאין צריך: אף השורק יתנשא ויתגדל ויתרום ויצין ציץ ויפרח לשאת פרי ולעשות ענף: ובעבור כי הפרי קרוב לשורק, ורחוק מן השורש, יתייחס לפצע הקרוב אליו ולמינו, וירחק השורש אשר רחוק ממנו:

מז.

למה יש בהמה מעלת גרה?

דודי, אחרי אשר הבין והשכל אל משמעת שמור, אין נכון וחכם כסוך: ואני אמרת, אחכמה בתולדות הבהמה, והיא רחוקה ממני: על כן היבטני (הביניני ל) יש בהמה מעלת גרה, ויש בהמה אינה מעלת גרה. נכדי, אל יבהילוך רעיונך, על זה פקחת עיניך: תדע יש מאדם ובהמה שנשתנו תולדותם זה מזה, יש מהם קרים מכל וכל, ויש מהם חמות מכל וכל, ויש יבשות מכל וכל, ויש מהם לחות מכל וכל, וירעת שחם הקרב טוחן המאכל עד אשר דק, ומבשלו והופך טראיתו לחם (יותר טראיתו) יותר מן הקר על הקר אשר לא יוכלו לטחון מאכלו מרוב קרתו, ומחוסר חומו ישליכהו ממנו אל פיהו, ולא ישוב שם עד אשר יסחן דק מבראשונה, וזה דרך השורים והעזים והכבשים: על כן קראו אלו הבהמות המעלות גרה בהמות קרות, והגוים קראום "מיל קניאן" ותוכל להבחין שחלב אילו (אילו) הבהמות קשה ומובדק בבשרם בעבור קרות בטנם, ולא כן חלב הבהמות אשר לא יעלו גרה:

ויאמר נכדו, ידעתי גם אני שהסוסים והחמורים הם חמים מן הנקראים קרים, ועל רחל מה תשיבני אשר היא במדרגה אחת מן החמור וסוס, למה תעלה גרה יותר מהם?

ויען לו דודו, שיניהם אשר משני צדדים יועיל להרק ולכתות להם מאכלם, ולא תוכל רחל בהעדפת החום אשר לא עליהם להתגרר על שיניהם:

ויאמר נכדו, אריב אתך ולא באיבה, ערכי לפני התיצבה, ובקש אל תדוחני, ואם תוכל השיבני: הנה אמרת באוזני כי כל קר ויבש יעלה גרה, והארס אשר מזה סתולדה ומה הסכע למה לא יעלה גרה, וגם קראוהו הרופאים "מילקניאן" בבהמות, מה שדברת? ויען, אעפ"י שהאדם מואת התולדה אשר אמרת, הלא ידעת שהוא נקרא חם מאלו הבהמות המעלות גרה: ובוזה הכחן, כי לפעמים בני אדם קרים, ומרוב קרות בטנם ולא יטחנו מאכל, וישוב המאכל אל פיהם, או בעבור שיש בו דעה נתעב המאכל בעיניו, ואשר בלע יקיאנו ממנו ויגרשנו:

מז.

למה כל מעלה גרה כאשר ישכבו יכרעו מפאת עגבותיהם וברגליהם אחרונים?

נכדי, אם שאילתך יבוא עלי הוצן, לא אהיה כנוער הוצן: הלא ידעת כי כל הבהמות אשר יש להם מפאת חלב ולמטה ויעמוף שיתחלב, לא כמו השור אשר מפני חלבו דובקו והוא קר וכבד מכברו לצד האחר, ומרוב כבדו ישכב מצד הכבד שהוא האחור?

דודי, הלא תשובתך בצדך, ואיך תשיב לנכדך דברו הבאי? כי אם ישכבו בגלל זה צד האחור, היה להם לקום מצד פנים שהוא צד הקל לפי דבריך, כאשר ישכבו כן יקומו: ויען, נכדי שאילתך בלבות פתאום תקלע וכפמיש יפוצץ סלע, ומוקש אדם ילע דברים עקיסים: ועתה הקשית לשאול, ואנכי אוכל לנאול, ושים לבך אל אמריי, כל בהמה שיש לה חלב והיא המעלה גרה, כשהיא עומדת ומכבד הקר והכבד, אמנם חזקה היא מאותו צד, לפי שיש בה חלב יותר עד מהנים היה חזקה יותר: ואם בעבור יגיעתה תשכב לצד האחור, הכבד בעבור חלבו שהוא נח מכובד יגיעתו משם יתחזק יותר, לבעבור כי בנוחו יחם מקרתו אשר הכבדו, כאשר הימין יכבד על השמאל והשמאל על הימין, ויחם לו, ואו יקל בעבור חומו ויתחזק לקום באותו צד:

יז.

למה לא ישחין העוף?

דודי, אמרתך על מצחי פותחים שפתים ישק משיב דברים נכוחים, וכל נכון לב יכסוף לאמרתך, ישא מדברותיך, וכן אשא ראשי, ועתה צמאה נפשי: למה העופות דמותיה' כוננות (שונות *l. as in margin*) כי כל שאר הבהמות השונות (השתנה *l.*) משחינות, ולא כל עוף בנף?

לפי התולדות אשיבך: חדע שכל הבהמות מנודלות מחלב, והחלב בא מרטיבת הצמחים ומלחוחית שבהם, ממאכלם עושים מסילה למי רגלים, במי רגלים הנגרים ארצה מוציא (מוציא) הלחלות דרך סקורות השתן, ואחרי שהרגל ללכת הלחוחית ממסילתו לא יסחם עוד: אבל העופות אין דרך תחילת גידולן מדבר המלחח רק מאכנים קמנים או מתביאה, על כן אין להם לחלוח מן המאכל, וכבא האבן בקורקבן סותם סקורות השתן, ומאשר שותים ומלחחים קרבם לא יגיע רק אל מקום נוצתם, והו' מן הלחוחית שבתוכם: תמרוט אחת מנוצתם המצא לחלוח בתוכו:

ועתה תשכילני, למה אין לעופות איסתומכא כמו לבהמות?

על זה הטיבות לשאול: חדע שהעופות גדילים ממאכל קשה כמו מאכנים וחיטן וכיוצא בהן, ואין האיסתומכא יכולה לסחון רק מאכלם כי אין לה חווק רק כנגד מאכל רך: אבל הקורקבן יש לו חווק, וקשה מן האיסתומכא כשמיר מצור, כי הקורקבן נעשה להרק כל דבר קשה, בעבור כי כל עבריו מלא נידין מבחוץ ונידון מבפנים, והבשר שבין גידי חיצינים לגידי פנימיים הוא חם ביותר, על כן יסחון עד כלה כל הנכנס בו:

יח.

דודי, למה יש בהמות רואות בלילה, ויש שאינו רואות?
דודי, שמעה אזני ותבן לה, לא חשבתי לתפלה, על אשר תתה על האיסתומכא, ועתה תשכילני על מראות עיני הבהמות, כי יש שרואה בלילה ויש שאינה רואה:

נכדי, הלא ידעת אם [לא] שמעת כי שבע עורות בעין הם, וכהם נמצא שלשה מיני ליחות אשר מהם תצא עיקר הראייה, ויש נקראין דוקין: הראשונה מן השלשה בתוך נקרא העין לבנה יותר מדאי במורה הראייה ומוציאה והיא כולה ראייה: של שנייה לה נקראת אמצעית, לפי שאינה לבנה כראשונה ולא שחורה כשלישית, והיא מקפצת הראייה שלא תפור יותר מדאי, והיא פקידה עליה: השלישית היא החיצונה שחורה מן השנייה, והשחרות שבה לקפוץ ולאסוף מראית השנייה, מכלי תת להם דרך לפורה הראייה כרצונה וכחפצה, והיא הפקידה על השנייה, וממנה עיקר הראייה: כי זה גלוי וידוע לכל החכמים כי אם תפוזר הראייה לפני לובן השנים לא תוכל העין להביט ולדקדק אל דבר קטן ודק: ועתה כשנקפצת הראייה על ידי השלישית אשר היא מפתח הראייה, על כן העוף והבהמה שיש לה הלובן בעין ויעדיף על השחרות הנמצא בשנים המספצים יוכל לראות בלילה, כי הלובן שבעין ישלם בחושך ובאופל יותר מבעוד יום:

וזה תוכל לראות, כי החתול אשר עיקר מבטת בלילה, וכל לא יוכל כנגד לובן היום כי הוא חזק ממנו ורך, כמו אשר לא עינד תשלום להביט בשמש, אך בלילה אשר אור השמש (אשר אור השמש) לא יעמוד לשמן לו יראה יותר: וזה ניסיתי בהרבה אנשים אשר יעדיף לובן עינם על השחרות, וכאשר יעברו אצל השלג לא יראו כלל או מעט: תוכל לנסות את דברי זה, בעת אשר תרצה להביט אל דבר אחר לפי יכולת עיניך, תקפוץ עיניך שלא תפור מראייתך, כי כשהמראה מפורות לא הביט לדבר אחר אך הביט אנה ואנה: והשומע ישמע וחרל יחדל, כי החכונה לנכון עוד מגדיל:

יט.

אם יש לבהמות נשמה או סברא?

על יצועי וכרחיך, כי חסר משכתיך, ולי תרדם בלבי מנמע חכמתיך, ועתה להשקותם יפוצו מעיינותיך, והודיעני אם יש לבהמות נשמה אלמות (אלמות נשמה ל). ואם יש להם סברא, אם לא, כי זה לא ידע אנוש באמת:

ויען דודי, הנה צדקת אענך, כי הדבר אשר אין לשונך (בלשונך ל), אמרת אין אזני נולה. ולא ידע איש בכל אלה: הלא שמעת כי מה שבספק אצל הפתאים, לא נעלם מן חכמים? ולבהמה יש נשמה באמת, כי זה ידוע כי הבהמות יש להם דעת, ובאותו דעת, או יש בו משפט הבחנת שינוי בין דבר לדבר או אין בו כלל, כאדם המביט על ההולך לקרואותו (sic), ורואהו ולא ישים בו לבו לברר אם לבן אם שחור, או פניו ירוקין או אדמים: נמצא שאותו שמביט בדעת הנמצא בעין אך בלא דעת הלב, כי אם ישאלוהו מי הוא אשר הולך לקראתך לא ידע באשר אחוהו תמהון:

ויאמר נכדו כן דברת, כי בדעת אין לו משפט הבחנה בין דבר לדבר, ולא סברא בדבר המשמשו די בדבר שהיא ממשמשין:

ויען לו דודי, הנה תתפש במצודתי: אם להם משפט לסבר, או אין להם דעת לבקש ולברוח מפני דבר כמו דבר שהביט עליו ולא תשפוט להבחין כל כך מאין הוא, ולא תבקש אותו ולא תברח מפניו, כי כן יקרא (sic) לך ולאחרים מבלעדיך: ואם הבהמות אין בדעתן כמשפט הזה להבחין בדעתן מה שהם רואות, איך יקרא (sic) זה, בראותך כלב אשר ירוץ מהרה ברעש וברונו ינמא ארץ ובעצם סרועתו יחזור, מה ראה על ככה? על כן אמרתי כי יש לו משפט לבקש ולברוח, וזה המשפט לא יוכל להיות מן הגוף לבדו אם לא הנשמה: ועוד קול הנשמע במי ששומע משים בו סבר, אם לא יעשה בו סבר לא יעשה כלל בעבור הקול: כי תראה בבהמות

אלמות כשתדבר אליהם תשים בו סבר, דא'ליכ' לא יעשה כלל עבורך, ואם אין זה אמת, לא תמצא בהמה שתבוא עבור קול: עתה תראה בלבך כי הכלב כאשר ירא וישמע דברי האיש יתחיל לעשות מה שלא עשה, או יגמור מה שהתחיל, אחרי שדעת בגוף ובסיס בגוף, ומשפט הבחינה אינה כי אם בנשמה: והבהמה יש לה משפט הבחינה: הלא תראה כי הכלב מפילות (מפלה ל) עקבות הצבי לרדוף אותה ששמח אדוניו עליה ושש בלבו? ובראותך כי כן הוא, אין זה כי אם משפט הבחינה והוא הנשמה, כך אמרתי: ויען, נכדי, נכדי! חלילה מלא להאמין דבר זה, רק כמו שאומרים העולם שיש להם דעת בלא הבחנת משפט:

ויאמר לו, דודי בחורי, הלא תבוש ותכלם כי דכריך סותרים זה את זה? ועתה יצא מפיך שיש להם דעת, וכאמרך שיש להם דעת הודית שיש להם נשמה: הלא בהריחך דבר, יש לו הפרדה על מה שהריח אותו קודם לכן? וזה הדרך ימצא לכל אשר יש בו רוח חיים באפיו, ולא כן דבר שאינו נד כמו אבן, אבל בכל דבר המתגננד כמו בהמה: ומאחר שזה הרוח לא תוכל להיות בלא נשמה, תאמר שיש בו נשמה: ועוד כי הנדנודים מתפרדים, האחד נדנודי הגוף, והאחד נדנודי הנשמה: נדנודי הגוף למעלה הם מתולדת האש, נדנודים למטה מתולדת העפר, נדנודי ימין ושמאל פנים ואחור סאוויר ומים, וסבות דבר ולשון לאחיות (לאחרים?) זה בא מן הנשמה, וזה הנדנוד ימצא בבהמות אלמות המתגנדות, על [כן] יש לי לומר שיש נשמה לבהמה: סוף דבר זה לא נוכל להעמיד על האמת שיש להם סבר שגנוד להיות בגוף ולא בנשמה: עליונות נשמת אדם שתעלה עד לרקיע לאשר נתנה, ולא כן בנשמת הבהמה, שהיא רוח שיעלה באוויר כמעט קט ושם יפרד אנה ואנה, וכלה כעשן ברגע לרדת למטה:

ואני ברכיה אוכל להשיג דבר זה מדרך הפסוק, כי לא נמצא (כלא) קריאת נשמה כי אם לאדם לבדו, והעד הנאמן, נותן נשמה לעם עליה ורוח להולכים בה: ואין טענה רק הפסוק, כל אשר נשמת רוח חיים באפיו, כי הוא דבוק עם בני אדם הנוכח למעלה: ועוד בציורה כתיב, ויפח באפיו נשמת רוח חיים, והיא הנשמה הנמצאת במצח המוח, כאשר נזכר בזה הספר: וביצירת הבהמה כתיב, תוצא הארץ נפש חיה למינה, והנפש היא בכבד, ומלת נפש כגורת ויצאתם ופשתם, שהוא לשון רבוי וצמות, על כן כי דם הוא הנפש: ואל תחמה בעבור שתמצא הנשמה נקראת רוח וגם נפש, וגם מצינו הגוף נקרא נפש, פדה נפשי מיד שאלו, וכן פ' אבי עזר: כי הנפש היא הכח הצומח שהיא בכבד, וכל חי משתתף בכח הזה: זאת הנפש נוף, והיא המתאוה לאכול ולדבר המשגל, והנשמה

היא העליונה, וכחה בטוחה, והיא מבקשת ללמוד לאדם מעשה השם ית', אך הנפש שהיא בכבד מבקשת תענוגי הגוף: ומה אוסיף לרבר זה, ובסוף פרשתיו:

ב.

למה יש לבהמות כלי ויינה עליה, מה שאין כן באדם?

אני הנכד, פליאה עלי נשנכה, אתמה כאשר אמצא יתרון על האדם מן הבהמה, כי לבהמות יש להן כלי זיין הנמועות בגופן ולא כן באדם: עתה דודי, לא מוח לי להתפאר שאני מנלה מיצירות המדע בלבי, אמנם לפי ראות עיני האדם ועיני הלב כי הכל נברא בקו צדק ובקו (ובקו ל) המישור: ידענו כי קרנים לשור הנקראים כלי זיינו, ולחזור שנים, ולאריה פרפותיו: יש לבהמות קצת להם כלי הברחה להיות קלים לברוח מרודפיהם והם רגליהם, כאיילים וכשפנים וארנבים, אך לאנשים נתן בוראם יתירה על כל אלה במצודות תחבולותיו לבקש כלי זיין:

ויאמר, נכדי, (הם) הסכת ושמע ואאלפך חכמה: הנה האדם נקרא בלשון ערבי בהמת המישור, ובלשון יווני בהמת הקו: ונכונה דברים, כי השכל נמוע בלכם לפי קו הנמדד בעולם ולפי המישור, להיות שלאנון ושקט בראותם עת שלום, ובעת יוליך הגלגל מסיבות מלחמות יתחמץ לבבו וישתונן כליותיו, לתור ולדרוש להכין כלי מלחמתו, ולשאת חנית מסע ושמה מנן ורומת, ויתחפש לבא בקרב, וכאשר ישקום הארץ ידע להקל גופו מכל אלה, וינח מועפו, ויחזור לקלותו: ואם היו כלי זיינו נמועים בגופו, יקוץ בחייו, וימס בראותו כי אין צורך עליהם, כי שלום מכל סביביו: ועוד אם יחרה אף איש אחד בו, או הוא יחרה באחר, יש להם שכל להסתיק סוד להתפשר יחד בדבריהם, והבהמות שאין בפיהם טענה צריך שיהא לכל אחד כלי זיינו שיראה לכל אחד לפני חברו: הנה דברתי לך על כלי המלחמה: ואם היו לו כלי הבריחה שהיו רגליו כאיילות קלות, היה שובב בדרך לבו, ובאותו נפשו ישאף רוח להיות פרא אדם, ושוקו וידיו וכל אבריו מרוב מריצותו: וכשבא שורד עליו נפתע ועת ולא יוכל לעמוד ולקום ולהתעורר מפני שודריו ולשאת כלי מרוב דקותו: על [כן] בראו בוראו במערכת שוה להיות שליו בעת שלום, ולהתאמץ בעת מלחמה:

[למה גירין באדם ובהמה? דודי, מקור מוימותיך נסיתי מבלי שבעתי, ועתה הודיעני, למה הגירין באדם ובהמה, ואיך אירע שנבראו תחלה קודם הבשר?]

דע לך נכדי, כי גירי האדם מחויקים ומעמידים כל האברים, והם

עשויות כרשת, כי כן נבאו החכמים הראשונים אשר קשרו בהמה ואדם בחבלים כל נופו, ויעמידו אותם בנחל שומף וכמקום אשר זרם מים הזדים עברו, ולקץ הימים ידועים מצאו הבשר כלה והעצמות שהם אוסרות הנוף נפלו, והגידין נשארו ברשתו במצורה: ועל זה הדרך ידעו והשרו (והשבו ל) חבלים הדקים, איכה יתפרדו בכל הנוף מן המוח אנה ואנה, והורו אל המקויון לרפאות הנוף להורידם מן הצורך לו, ועוד כי בנידים יתקשרו האיברים, ויחויקו ברצועות קטנות, כהנות עור למלוש האדם:]

כא

למה יש ערום שוכת, ויש לפעמים שומה זכרו (וזכר ל)?
עלומות אם לכדוני כחרטום, ישמחו כל דוה לבב ואלמן, כי דודי לבי נוקפי, זכור אוכירך עוד לרבות צמא למשא לי: ועתה נעלם ממני למה ערום ושוכת, ויש אין ערום וזוכר (sic)?

נכדי, אחרי במעלות השכל עלית, שגנות בלבך-סלית: ידענו כי כח הנשמה בכל הנוף, ויש מקומות בניף האדם שיש בהם מן החבלים היוצאים מן המוח שירגישו יותר מן האחרים, כגון העיניים והאזנים, כי העצמות וגם הכבר לא ירגישו, והנה הלב קבל כח כל הנשמה יותר מכל אברי הנוף, על כן כל האברים משרתים לו, וכל מה שהנשמה פועלת בנוף בא מן העור שהנוף עוזר, ועור אח' מן המוח והשיני מן הלב והשלישי משאר איברים, מן המוח הערמה ומשפט הבחנה והזכרון, כי בראשינה מכין האדם ואח"כ שופט להבחין מה שמכין, ואח"כ ישים מה ששפט לזכרון לשנים, בנקבים שהם במוח על המצח, שם יתחבר כס חמש הרגשות, ומשם ינחל להראותו המחשבה: והנה אפרש לך זה באר היטב: הבינה שבא מן הערמה והמשפט והזכרון לא יבואו מדבר אחד רק מדברים משונים: הערמה בא מן לחלוחית, הזכרון בא מן היובש, כי כל דבר לא יקבל חתום (חותם ל) צורה ודמות יותר מדבר יבש, והיבש לא נקל בו צורה ודמות אך משעה שקיבל חותם צורה ודמות, לא כשהרה ינתק ויוסר ממנו, על כן מי שיש מוח יעמוד בו הזכרון, אבל לא הערמה:

דודי, אל יחר אפך בעבדך הסטריחך, הודעני באר היטב זה הדבר ואבא עד תכליתו, כי באוני שמעתי אומרים כי מפקד הצורות ומשפט הבחנה והזכרון שהם שלשה חלקים כאשר אמרת, והם כלם כמות, ואם זה ידעו החכמים הוי הוי הפתיים: ואני שמעתי לחכמי מערב וקדר ופתרו לי כי ראיית הצורה באמצע נמצא, והוי מראית הצלם, פי' איש או אשה, או שום תשים עיניו לראות הצורה ומשפט הבחנה באמצע המוח, פי' כשראה

הצורה ישפוט לברר ע"י הראייה ויבחין מה היא להכירה מאחרית: והזכרון באחרונית הראש בנקב האחרון של מוח, והמקום מקום משאר הצורות, פי' כי אז יזכור מה ראה ומה שפט:

כב

איך נודע הכרת הרפי' והזכרון והמשפט?
ועתה שאלתי ממך, איך זה נודע אל ילוד אשה, כי מעשה הנשמה איך תודע?

נכדי, לאיש שאין לו בינה סבור שזה לא יוכל להיות, כי בזויות לאויל חכמה, אך דא (דע ל) נא כי מי שגלה סוד זה בראשונה לא נעלם ממנו, ואתה תוכל להבין איך ידע: הנה שם בלבו לדעת למה ניקב המוח, וראה אדם אחד אשר כולו שאנן ושלין, ובמקרה פצעוהו במצחו מקום העקר הצורות, ומן היום ההוא לא הכיר הצורה, ועדיין נשארו לו השנים: ומצא אחרי כן איש אחד אשר נפצע באמצע המוח, ולא הבחין בין דבר לדבר: וכן השלישי צד הזכרון, וכן כי קפ יש ביניהם: על כן ידענו כי הנשמה איננו נוף, אלא פעולות הנשמה נודעת בין דברי הנופות:

כג

למה החוסם עומד על הפה?

לשון חכמים מרפה, ועתה הודיעני אדוני, למה החוסם על הפה, כי דבר נתעב הוא אשר ירד ליחו' האדם על פיו?
ויען, לא אחכמה לשאלות על זה נכדי, אך דע כי החוסם והפה אינם ראשי אברים כמוח ולב וכבר, אלא להוריד ליחות הראש, ושני אשר בהן להוריד ליחות הראש מימין ומשאל: ולבעבור כי הפה אבר הנוף, ולא (ולא) יוכל נקב בכל הנוף להיות מן הבטן על (עד ל) הפה למעלה רק הפה, והשמה הפה קרובה אל הבטן להריק ליחות הבטן ולהקיא:

כד

למה ספאת הראש ימרם הראש?

דודי, עתה דבר גדול אשאל ממך אדרוש: למה ספאת פניו ימרם הראש? הלא הצור אשר בראהו ויפהו ככרוכ ממשח, ומאוסה מכל יופיו לא נעדר, היה לו ליפותו מצד פניו, ועתה שכולה יש בו על זה ונבוה ונלעג על דרך עלה קרח, ואם מצד התולדות קורחתו היה לאחרונה באחרונית הראש:

ויען דודו, נכדי, אם הייתה נכון תבין מתוך דבר, כי מה שהגדרתי לך הוכל לדעת זה, כי כל דבר שיכנס בכמן דרך הפה, ודע מבואן כי לא יכנס בכמן רק דרך הפה, והמאכל בכמן ימחן ויתבשל כסיר על האש, בדרך אשר בא המאכל יעלה עשנו למעלה, וזאת הדרך קרובה היא לצד פני אדם, ורחוקה קצת מאחורי הראש, ובעבור עשן הכמן ירחבו ויתפשמו נח כי (נקבי ל) הראש כנגד העשן כי כן מסילתו, ולבעבור כי חום הכמן אשר ירתיח כסיר יתפשמו נקבי הראש וירחבו יוצא משם הלחלות, ולא תוכל לעמוד בעבור רוחב הנקבים: ועל זה הדרך יקרה כי הבחורים שהם חמים ביותר להיות קרחים, כי השער לא ימצא מעמד בעבור הנקבים:

כה.

למה ישמע הקול באזני אנשים הרבה?

מסילות פתיות אשר ירבו מוקשי, עד אנה תיגיון נפשי? כי אם אתה אומר לא נעלם ממנו דברי, יולד בלבי ספק על מיומתי נכרי (sic), ועתה אדוני מרשת זו תוציאני: והנה חכמים יגידו שכל קול היוצא והנמצא והנשמע הוא האויר, וידוע כי האויר הוא נוף, ונוף אחד לא יוכל להיות בהרבה מקומות משונים, וא"כ אם יוכל קול אחד להיות באזני אנשים הרבה?

נכרי, מסקור דליות זה, אהה ליום אשר לא צללה דלייך למצוא התשובה, אך מסני פרייך נמצא: דע כי האויר הנמצא בפה האדם ונדרף חוץ למה מן הלשון ומן הנרון, זה אויר היוצא מפיו ממנו רוחה המצויא בחוץ לפניו, ואותו הנמצא רוחה השני, והשיני השלישי, וכן הרבה, עד שיתנברו האוירים להרבה אזנים, ואילו האוירים דומים זה לזה ואינו אויר מחדש: והמשל תשמע להבין באבן הנורק במים, אשר יעשה עיגול כהשליכך שם, ומאותו עיגול יוצא השיני, שלישי, ורביעי:

כו.

למה ישמע הקול מעבר לחומה ולא תראה?

ויאמר נכדי, לפי דבריך מדוע קיר ברזל וחומת נחושת ואבן לא תמסק הקול, אך (מעביר) מעבר הקיר ישמע? ואיך יש כח לאויר לעבור ואין מקום פתוח? ולמה כמו כן לא תוכל לראות מעבר לקיר, כי גדולה גבורת העין מגבורת האוזן?

ויען דודו, הלא ידעת אם לא שמעת כי כל גופות מנוקבים, אם לא תבחן זה במראית העין אבל בואת תדע, כי הויעה העבור בו באבן ובמתכות,

ידעת בויעה ובשיער שפישר, והקול שהוא האויר יעבור בנקבים שאינם נראים וישמע לשומעו: ועל אשר אמרת מדוע לא תשלום העין לראות באלו הנקבים כאשר תשלום אויך לשמוע? הלא תדע כי מלא אופל ומחשך העין, ועיניך שולפת לראות עד החומה, כי האיניר (ה) תורח עליו ממש או פנונה נגדו, ולא מכסה החומה, כאשר ידע האור עד (ה)פה תבוא ולא תוסיף, כי לא ישלום בתוך החומה:

כז.

למה ירא העין?

ויאמר נכדי, אחרי אשר כל זאת ידעת, מצאת אשר ינעת, ואין לך נואל קרוב ממני, אחת מחלקת חכמתך תנחילני ותשכילני: ומה מראית העין, ומדוע רואה?

ויען, שאל ממני (ממני) ואתנה נחלתך, כי כל עוד נשמתי בי להשיב על שאלתך: דע כי כמו חוש אייר וך מאוד מתולדת האש, והיא מאותו אויר הידוע שנגזר מתולדתו יורד על שני גידין היוצאים מן המוח עד נקב העין הנקראים נופות רכים, ולא מצאו יציאתן בכל המצח וסביביו, לפי שהכל קשה, רק באילו (באילו) שני הנקבים הרכים מאוד, ומהם יוצא המראה: והמראה גם היא נקראת נוף, על שם האויר היוצא מן המוח נקרא נוף, ואמנם מרכבת מארבע יסודות, אבל האש יתירה ותעדיף עליהם להתנבר:

כח.

אם הנשימה ממשות או דמיון:

אדוני, על הנשימה היוצא מן הפה ומן הנוף, תודיעני אם היא ממשות או דמיון:

נכדי, זה קל לדעת כי בה ממשות, בעבור כי היא באה מארבע יסודות השלימים בנוף:

כט.

למה העין תשלום וכו'?

דודי, בנפול תררסה על אנשים, רעיוני יבהילוני לדעת, למה העין תשלום למחר לראות הככבים ולמשוך מראיתה משם בלי עיכוב יותר מן הדעת: כי בעיני יראם יחר, ולא תוכל הדעת לדעת מספרם, והנה העין מהירה מן הדעת:

דע לך נכדי, כי המוח אשר מושב הנשמה לפי דעת רוב חכמים קר מכל וכל או חם ולח ומן המוח בא הדעת או קר הוא מכל וכל או חם ולח: על כן אם העין תביט לדבר שבתולדתו כמו הכוכבים שהם מתולדת

האש, כל אחד מביט אל אוהבו פנים אל פנים וממר (ומסתר ל) לראותו, וזה מכח הנשמה.

ויאמר נכדו, כשנסגרת העין, למה לא תלך הראייה מכל וכל? ויען לו, אתה ידעת כי כל דבר אשר ינוח מכל נכדו בכוחו, והאוויר שהמראה יוצא ממנו ינוח ויתנכר בתולדתו, משופר מראיתו אנה ואנה כפתיחת העין:

ל

למה הנשמה מקבלת הראייה?

ואת החרדה תהיה לך ליתרון, ותשחק ליום אחרון: ודע נכדו, כי משיב (מושב ל) הנשמה במוח כאשר הנדתיך, ומסנה יצא כח כל ההרנשות ותנועת החפץ, ועתה ידעת כי חמש הרנשות נעבדים לה, ואילו הן: ראייה, שמיעה, הלעטה, והרית, והמישיש: ומה שעינים רואים בחוץ ינידו לנשמה על דרך הנידון המסבלין הראייה, וכן לארבע ההרנשות הנשארות, כי כל הנידון אשר ביד, וכן כל החבלים אשר בכל האברים, מסילתה מן המוח: והעינים והאזנים הם המרגישים יותר, מלבד הלב אשר נוסדו יחדיו:

לא

למה לא יוכל הרואה לראות פרצוף בזכוכית?

בשפתי נכון תמל חכמה, אם מן הפתאיים נעלמה: ועתה דודי, הודיעני למה לא יוכל הרואה לראות פרצוף בזכוכית, והוא יכול לראות במראה הנעשית ממנו:

גם על זאת הטבת לראות: שמענה, ואתה דע לך, כי העין אויבת מחושך ואופל, על כן המראה הוכה מצד העין ומאופלת מצד אחר: מראית העין שולמת בו עד החושך ולא יותר, וחזרת הראייה אל העין ותניד ראייתה, אבל הזכוכית אשר וך משני עברים תעבור הראייה דרך שם, ולא תחזור אל העין:

לב

למה העומד בחושך אינו נראה?

עוד תשכילני, למה העומד בחושך אינו נראה מפני העומד באור, והעומד באור נראה אל העומד בחושך:

נכדו, זה היה לך להבין מתחילת דבריך: הלא ידעת אור וחושך אויבים זה את זה והעינים כשיביטו בחושך לא ימצאו מעמד, ויתעו מדרכם להביט באויר חיים והנה תולדותם תועה ורועה רוח? אך כשמבטם לצד האור שתולדותם ממנו, ולפי הראייה מן הנשמה שבמוח

שהיא אור החיים, יתעננו בתולדתם להביט אל האור, כאשר הם נגזרו מתולדותם, והנה הסבים נוכח עמו:

לג

למה אין העינים לאחורי הראש?

עוד תשכילני דודי, מחסדי, והודי, למה אין עיני האדם אחורי האדם? הלא ידעת נכדי, שלשה חדרים שבמוח, הראשון להבטה, והשני להבין, והשלישי לה[ו]כיר: הראשון שהוא להבטה הוא כאמצע המצח, רואה הדבר בחוץ ומגדת אל השניים, והשנייה שהיא המוח מגדת אל השלישית להזכיר, שהיא באחורנית הראש, ואילו היו נקבי העין סמוכין אל השלישית תבא מהן הזכרון:

לד

למה האף מריח, והחיך מטעם, והיד ממשמש?

ארונני, בחושך דבריך אמצאתי (sic) כנים, ובעת שתעו בלבי רעיונים, ינקתי ראש פתנים, ומדייני כארמון באח: למה האף מריח, והחיך יטעם, והיד ממשמש? ועל איזה דרך בא להם כל זה, ואין אחד מהם עושה מלאכת חברו? ולמה? כי לא מקנאה אשאלה משאלי, אך אם [אין] אני לי, מי לי?

נכדי מחסדי, אם ספקות בלבך הניחם, ספר סוחר ואין לחם, אך לקבל שאילתך בכל אשר נפשך ישרה, הנה לבי הקימותי לך למטרה: ועל אילו שלשה הרנשות, שהאף מריח, והחיך יטעם, ומישוש היד, דע כי נגזרו לעשות מלאכתו כל אחד לפי מעשיו בדברים זולתם החיצונים מהם, כי בלבדם לא יעשה דבר: האף אם לא ימצא ריח בחוץ, או סמתוק הפוח ובושם, או מדבר סיניף נמצא, ושאויר בא סהאויר הנולד מעשן דבר הנמצא, ומאותו אויר יגיע אל אפיו ומריח: ורא כאשר חשבת, כי נקבי החושים הקרובים אל הפה יריחו, כי אם יתחכו עוד הקשה שבחושים עדיין יריח, אך הקשה שבחושים היוצא(ו) מבין העינים ונמשך עד החיך, אותו הקשה קורי' בערב דדי הריח (?), אם אותי יפהם לא יריח כלל: והוא נעשה על מתכונת הריח ומסילתו עד המוח, וקשה מבשר ורך הוא משאר עצם, וכל זה כדי להרית בחפזו ובמהירות, כי אין כח בבשר בבשר המוח, והוא כלי הריח: וכן נמצא ד' דברים הנאים מן המוח המניעים לחיך וללשון הנקראים כלי המעימה, וכן יש נידון ידועים אשר מסילתם מן המוח אל היד הנקראים כלי המשמוש, כי היד תבחזו בין חם לקר, וזה בעבור גידי המוח שהם מן הנשמה: וזה לא יעשה מלאכת חברו, היד לא תריח, כי לא נעשה על מתכונת הריח, והאף לא ימשש ולא יטעם: ורעת לנפשך ינעם:

לה.

למה יבכה האדם בעת שמחתו?

אשקפה ואכימה במכונני, ומייד תורתך על לשוני, ועתה על זה הבינני, אשר ירעת כי אהבתי אותך מכל הנולדים, והנה רעיוני כך: ובהיותך בצור ובצידון, ובסבבך כל גלילות פלשת ימים רבים, עד אשר נואש לבי ממך, ואמרת לא אוסיף לראות עוד, ובהגיעני (ובהגיעך ל) למחוז חפצך שליו ושקט, והלכתי לקראתך ולשמוח בלבי חבקתיך ונשקתיך, למה זה עם שמחת לבי וילו עיני, ומאין יבוא הבכי, תחת אשר היה לי לשמוח עליך: ויען לו נסת נכדי הבוס נופת, כאשר ירך הראש בין מנופפת: הלא ידעת ושמעת כי שמועה טובה תרשן עצם? כן ירעת כי השמחה תרחיב לב האדם, ותוליד ותצמיח ותגדיל ברנע קט חום בנוף, והוא חום משונה, ויעלה עשנו עד המוח לפי שעה, והלחלוחית אשר שם ימצא ימעיטנו ויסיענו ברומב ובלחלוחית, ויולו מים מן המוח עד נקבים הראשונים אשר ימצא תחילה, ועל זה הדרך תרדנה עיניו מים:

לו.

למה מפה אדם יצא קר וחם?

דודי, על זאת לב חכמים נחקר, למה מפה אחר יוצא חם וקר? נכדי, לזה גם על זה לחכמים אם הפתאיים מזה אלמים, ודע לך נכדי כי כן הסכמת כל חכמי הודו, וברור הוא כי כל רוחות הגוף באים מן הריאה, ובררך אחד יבואו להפרד, כי לא תשתנה מסילתם: על כן יש לך לדעת רוב החום כשבא מן הריאה מזה בלי עיכוב יעלה מהר אל הפה, ועת שימצא מה פתוח יצא חם כאשר יצא מן הריאה: וכשיבטל בדרך בהתייחדו בפה בהיותו סגור, ויעכב (יעכב) עם הרוח הנכנס דרך החופם, ויהפוך לקר, כי אין דבר מכל ארבע שרשים הנקראים מוסדות אשר יתחלף מהר מחם לקר כמו הרוח:

לו.

למה ינשבו בפני אדם לקור חוסו?

דע אדוני, בהיותי בצוען באהל בל יצען, ואשמע אחר מן החכמים שואל מחברו, שאילה גדולה היא אלו, ויאמר לו, ידוע כי כל דבר המתנדנד (המתנדנד MS.) יחס בנרנדו, כי כן דרך כל גופות, ולמה יסיעו וירחמו לנרנד רוח בפני אדם להקר מחוסו? ואותו השיב לו, כן הדבר, כי כל הנרנדים יחמו, כי כן התולדות, אך הרוח שבתוך הגוף האדם חם הוא ביותר, עד אשר תצא ממנו הויעה על יסיעו האויר, והאויר והרוח

שכחון אעפ"י שהוא חם להוציאו עד פני האדם להקר חום הגדול הבא מקרב הגוף: ובהגיע רוח חייוני לרוח הפנימי יהיה האדם מחוסר משניהם, לא חם ולא קר: ואני אחרי שובי גיליתי אחני באלה, כי כן שאל לו וכן ענהו: ואני שמעתי ולא אבין, כאשר למדתי מנעורי כי כל הדברים [הדומים] זה לזה במבט אחד מוסיפין על כיוצא בהן, ואשר לא ידמו זה לזה ואינם ממשבט אחד להפסידו ויאברו זה את זה: ואיך נאמין כי רוח חום שיקר ויצונ רוח חם ממנו?

ויען דודי, אשר ענה כזה בא אל נכון, וירי אתו מאד אל משמעתו: ובאומרך איך רוח חם יצונ ע"י רוח חם, הנה לך המשל, שהמים חמים יצוננו על ידי מים פושרים:

ויאמר נכדי, אם הביאני ממים, אביא לך מאש: הנה לצנן סדורה גדולה מעצים הרבה והרוח מסיעו מבושרת, ואצלו אש קטן ותשליכנו אל האש המבושרת המדורה הגדולה, הלא תגדיל המדורה ויראה לפני טראית העין גדול וגבוה מבראשונה, עפ"י הנכורה תגדיל חוסו, על דרך הרבה עצים בדליקת האש? כן רוח חייוני חם יוסיף על חום פנימי חום גדול ממנו:

ויען דודי, על זה כמה מיומותיך ושבה, מה לחבן את הבר, כי תמשיל אש למים: הלא ידעת שהמים בתולדתן קרות, וכשיחמו אותם יכריחום ממבעם להחליפם בתולדות האש, ואם יתערבו מים פושרים באילו מים חמים נקל להם לשוב לתולדתן בדבר טועט, על כן האש בתולדת חוסו יעדיף על כל דבר ואם תשליך בו אש מעט, בקל יש (נקל חיש ל?) להעדיף על תולדתו מוקד על מוקדו:

ויען נכדי, הנה זה אאמיצך כמו פי להודות על דברך שהמים הפושרים מקרים את החמים, לפי שאין תולדתם חמה, אמנם יש הכרחה בנוף המעשה להקר: ולמה זה כששני אחות חמים, אחד חם מכפנים, ואחד חם מבחוץ, ואין הכרחה להקר כי אם להעדיף, כי תולדות שניהם חום, זה היה לו להעדיף חום על זה מדרך התולדה, כי זה ידוע, דבר מוסיף על טבעו ועל מינו:

ויען דודי, כי לפי עקשותיך ולפי סברך אין דמיון לרוח עם המים מקובל לך: אמנם רוח החיוני חם, ורוח שבאדם חם וחם ממנו, וכבא המדחף והמשבט ונאצל ונספה רוח החיוני עמו בהכרחתו נרדף רוח חם שבנוף דרך אשר בא ונכנס בנוף, והנה ישב רוח החיוני על עתה, ולא מרוב עתה בעירובם אך מדחיפת התיכון וקבלת החיוני, לכן מנשבין לרחוף רוח חם שבנוף לרדוף ולהביא החיוני במקומו, כל זה כוריוות המדחף גם זה

ויש בזה במקומו, ועל דרך זה האדם ממוסך: ואל תחשוב כי זה רוח החיצון יתערב עם רוח הפנימי כעירוב מים במים ואש באש, כי זה נכנס וזה יוצא, וכא זה על פני האדם וכו' (וקר ל.) ירחף רוח חם, וזה יש במקומו אשר לא ישיג אל חומו:

לח

איך אוכל (יוכל ל.) לסבול הגרון חום יותר מן הפה?
 בן משק ביתי ישים אל פני מנסתו אל מכון הדעת על אברי הגוף, והוא בשאלתו הבהילני וכל הנלוים עלי, אמלטה רק אני לבדי להניד לך: הנה שאלני איך אוכל לסבול אוכל חם בנרון אשר לא יוכל לסבול הפה סרוב חומו: שמעה נכדי ואדברה, ומילין עליך אחבירה, בהשען עליך היית לו לקנה רצון, וכדברים האלה כהנה וכהנה היה להבין דבר סתוך דבר: הלא שמעת כי האברים הקרובים ללב ולרואה חמים יותר מהרחוקים, והנה הגרון קרוב אליהם מן הפה, על כן הוא חם יותר לפי המדרגות, ונקל אברי חם לסבול חום אשר יתחבר אליו: ואם אברי הפה חמים, חום הגרון יעדיף עליו, ולא יוכל לסבלו כי קוד הוא לפי חום החיצונה הנכנס בו, וכבואו דרך הגרון החום שוה בשוה או קרוב לו:

למ

למה אין האצבעות שוות?
 דודי, באו דרך לא נקלה, כי מובה תוכחה מגולה, וכליותי בכל צורכם לא השכילו, ודעת שפתי ברור מללו: ועתה השכילני, למה האצבעות זה [את זה] אינם מניעות, כי אצבעותיו האדם אינינו שוות?
 גם לזו אפתח שפתי עמר, ואם לא ידעת למה היר חלולה, למה לא הוקיקך לשאול עליה? אך דע נא, כי תולדת בראה כל הצרוך לאדם, כי אין בכל אבריו דומין לכלי רק היר, ועת שיצטרך מים לשתות, ויסלא ירו מים מהם ויהיה לו כלי, על כן היא חלורה:
 ויאמר נכדו, השכלתני על חלול ולא על האצבעות: ויאמר לו, מה שאין האצבעות שוות, לפי שהיר חלולה, ובשתשים אצבעיך בחלל ירך יהיה כל המערכת אחת, וזה צריך לחלול היר לקפוץ ולקפוץ כל דבריו: אם האצבעות כאגודל לא היה לאחוז ברבר שלא יפול חוץ מחופנו:

מ

למה לא ילך הילד מיד?
 דודי, אחרי אשר עלינו במעלות מתכונת האדם, נחפשה דרכינו ונחקרה לדעת למה לא ילך הילד כשגולה, וישען על רגליו כבהמה וחייה:
 ויען דודי, שים לבך ועיניך ראה, כי אבריו רכים מכל בהמה, ונברא על

מתכונת שילך בקומה זקופה ונעלם (ונעלה ל.) להביט אל השמים, וזה דבר גדול ומשונה מסתכונת על ארבע: ויאמר לו, גם אלו שני דברים נפלאו ממני, ולא אוכל להם:

ויען דודו, למראה עינים למשמע אזנים ידענו, ולא נעלם ממנו, כי שלשה עולמים ברא הקדוש ב"ה יתב' ויתעל', והאחד שפל, והוא על מעלות רבות בצמחים ובמתכונותיו, והאדם שבאה (שבה ל.) הוא לבדו במעלה העליונה: ועלם השני, צבא השמים ככבים ומאורות, והוא נקרא עולם האמצעי: עולם השלישי, למעלה למעלה הימנו, והם המלאכים המשרתים הבורא, ונשמת האדם נגזרת מאורם, ומקבלת כח העליון כפי מערכת המשרתים: על כן ידוע כי נשמת האדם נבזה מן העולם השפל, להכיר בה מעשה בוראה, וכל הולכי על ארבע לא נבראו להכיר מעשה בוראה, אך באדם נמצא כתוב וכבוד והדר תעמרהו, וזה בעבור הנשמה ששפח (שנפח ל.) בו, והיא מאור המלאכים נגזרת במאור היוצא מן השמש: ואם היא הניח תאות עולם השפל, תוכל לעלות במעלות גדולות ולקבל כח גדול מכל עליון שקבלה על ידי אור המלאכים: וזה הדבר צריך פיר' ארוך, אך החכם כרמו יבין מה שאמרתי לו, כי אברי האדם שהם רפים, ואשר בקומה זקופה מדרך התולדה, וזאת התולדה נקראת נשמה, ושים לבך באלו שני דברים, כי מהם נאה לאדם סיבת ההליכה: ולפי שהנשמה העליונה נתנה בו, היא רוצה לדקדק בפעולות האדם, ולאסן לו אברים כמעשה אומן לפעולותיו בלא עצמות גדולים ואבריו בעלי גרם, ולעשות בידיו מעשים אשר יעשו לפי מתכונת הנשמה ולפי מה שצריך לו, לתפור ולקרוע, לקצור ולזרוע, לקבל ולחלק: ובאלה הפועל צריך אברים רכים למשמש וליגע כפי חפצו, ולא מן מתכונת הבהמה אשר היא נבראת חפצו בעבור האדם, וצריכה אברים נסים ונרמים כמסיל ברזל, ועצמים כאפיקי נחושה, על דרך ורב תבואות בכח שור, ולבעבור עבודות רבות, ולמשוך בעול משאות משא: הנה הודעתוך למה יש לאדם אברים רכים, ומה תוכל להבין מנור' וכסאה ברבר זקוף ורך, ושתהא מבמה אל השמים לשוב אל אשר בראה, והיא חצבה עמודיה, מן תמנף ותתאבק בעפר הבהמות סהלכי ארבע: והיא כחרה מקומה בראש ובמות, ותאמר פה אשיב אל אמתיה, והוא המקום שתוכל להביט כל הנוף אשר תחתיה, כי כן חפצה לשמור כל הנוף כאשר נמסר בידה: ומה תוכל לדעת כי לא לחנם ברא תולדת האברים רכים וגוף זקוף, אך לא מן האדם לפעולותיו, וכל זה בעבור הנשמה: וכאשר אברי האדם נכונו לפעולותיו ולפי מעשיו, כן הבהמה אשר היא בעלת גרם לפעולותיו, לפי הנשמה היוצרת היא למטה לארץ:

מא.

למה האדם יגדל תחלה מחלב?

דודי, תבקש ולא תמצא אנשי מצותיך לפעולת אדם, כדבר שפתיך נבראו אבריו כאשר אמרת, ולב נבון יעיד כל זה: ועתה ערכתי בלבי תזוק והמכשלה הזאת תחת ידיך, להגיד לי למה האדם יגדל מחלב, כי זה ידמה אכזריות ומעשה מינוף אם, ולא כן המנהג:

ויען לו, תקחנה עיני (אוני ל.) חרשים, הלא כתבתי לך שלשום כי כל דבר גדול ונוסף בדבר שמבעו ממנו? ועתה ידעת (שהודה) שהולד כולה מדם האשה, ואחרי אשר יצא לאויר העולם נהפך הדם הגדול באשה ונעשה חלב על כן על דרך התולדת יגדל הילד מחלב שהוא מינו: וכאשר הניגוהו (הנהיגוהו ל.) בו תחלה, יש לנו לומר, כי ראו מנהג החיות והתנינים אשר חלצו שד להניק גוריהן ועשו גם כן לילדיהן: ויאמר נכדו, בעל דבריך יגש אליך כאשר יתמה על מילך, כי החלב מן הוולד ומטבעו, והוא גרוש ויגמול ממנו, מדוע אינו טוב לבחורים ולוקנים כי תחילת גידולם ממנו היה?

ויען דודו, בעבור קצת דברים תחילה גידול האדם מחלב, בעבור מהירות, בעבור רוח האברים, כי דבר אחר צריך לגידול לחיי הילדים הרכים, ודבר אחר לשני הבחורים הקשים, ודבר אחר צריך להולדת נערות, ודבר אחר לבחורות, ודבר אחר מתאוות האברים הנגמרות, ודבר אחר אברים שאינם ננכרות: אמנם איני האיש אשר יחפוץ לומר שחלב האשה יהיה קשה לבחורים ולוקנים, אם חלב הלכי על ארבע קשה להם, אך ידמה לאכזריות: כן דעת האוכלין והשות' אותואו נוסע', פן יחסרך (פה חכר ל.)

מב.

למה יתננע האיש בשכיבת האשה?

בחיך שכל מעיפך אמונים, וויסותיך יבאו אודים העשונים, על כן נכספתי לאמרתך: ועתה דודי, הודיעני למה [יתננע] איש בריא בשוכבו עם אשה אשר נתן בה מנוגע שכבתו, והיא לא תתננע:

נכדי, אם תרצה לידע סבת זה הדבר ועלילותו, שים לבך לדעת תולדת האיש והאשה, כי האיש חם בתולדתו, והאשה קרה בתולדתה, ותולדת חום האיש תתיחש אל היובש, וקרת האשה אל הליחה, על כן כשתקבל האשה זרע מנוגע שהוא בא מחום ומיובש, קרתה עם ליחתה ירחה את נגעו, ולא תוכלי דרך לשחת, כי דבר קר ולא לא ימשוך אליו חום ויובש:

אמנם הזרע אשר בה נזרע לא יאבד תולדתו ויכולת שלו, ובעת אשר יקרב אליה איש בריא מן היובש ומן החום שבו ומן התולדת הדומות יקרה שמוציא חמים שנתן בה חום לחיכו ויובש ליובש, כי כמו שהקרות והלחות דוחות מחום ויובש אשר לא מטבעם, כן חום ויובש מפתים אליהם מינו ומטבעם:

מג.

למה שנשים קרות מתאוות לאיש יותר מהאיש להם?

תשובות אדוני שאלתי קרעו, על כן דברי לעו, ואדרה כל שנתי, לרוות מויסותי ממוימותיך, על כן בא אלי השאילה הזאת, ותהי תוך לבי כאבן, עד תוציא מצרה נפשי: למה מתאוות נשים לאיש יותר ממה שהוא מתאוה להם, כאוסרך כי הם קרות בתולדותם? הנה על דרך התולדת תאנה האיש תתנבר מתאוה שהיא מתולדת החום:

ויען דודו, קרת האשה אינה לזאת התאוה, אך הליחה שיש בה יותר ממה שיש באיש, והבן למה, כי הדם שבה אינה יכול להתבשל בה מפני קרתה כמו שיתבשל באנשים החמים, ומתאוה הדם לצאת חוץ, וצריך שזה הדם יוצא בעלילת איש, ובמקרה שכיבה, ופליטה זרע: הזרע של אשה אינו רק דם מראהו לבן, ובעבור קרתה מתאוה מתחמם מאיש אשר הוא חם, כי כן דרך קר הוא: הרע כי הנחשים בעבור קרתם נכנסים בפה האדם כשהוא ישן בעבור חום האיש:

ויען נכדו, איך שדם קר באשה, והליחה בה יותר?

ויען לו כי הדם נרתח מעור הקבוע לווסתה, כי תולדת מעורה להשליך דם חוץ מקרניה בזה עניין שצריכה לאיש, אעפ"י שהאיש יקרה לו נגע בעלילות האשה ששכב עמה כנוגע, והיא לא תמשיך החולה (החולי ל.) אליה אם לא באלה שלשה דברים, שהוליד בנים ממנו, או שתמשוך אליה האויר היוצא ממנו הנקרא אויר מנותק, או כשתנבר תולדתה להיות חמה ותעדיף חמתה על נשי' הקרות:

מד.

למה יפרד איש מחיותו וימות?

אדוני לבית חכמים נרפס, ממנו חפש מחפש, לדעת משאל' זה, והקל להשיב תשובות פתיים, לאמר כי ברבר הפרח היוונג להפרידה, כי זה ידוע לכל היקום: אך ידענו כי כל אשר נסדר בקו צדק ובמישור, ויש לחכמים לדעת ולחפש עניין העולם השפל, וללמד מכה מעשיו חכמות ופוימות, ולהבין דבר מתוך דבר למה: ולפי שהונעתך לדבר בעניין החיים,

אל יחר אפך אם אאריך לדבר בעניין המתים: ועתה שים לבך כחיפוש השאל', למה יפרד אדם מחיותו וימות? לא אשאל על הרונים אשר ימותו בלא עת, כי עלילותם נודעת, אך על המתים בלא הכרחת הריגה ומביעה, כי היש [האיש L] נברא על מתינות החיות, ואין חבורה טובה כחבורת הגוף ונשמה, כי הנשמה הכינה מבינה כחפצה, ממכון שבתה השניחה אל כל הגוף לכוננה כרצונה כאשר נדברנו: ואיש באחיה ירבקו, ותשלח חבליה וגידיה לתפש בכל הגוף ויתלכדו, ואיך יתפרדו, ואחרי אשר היא כשומר מגדל עז? עתה תשכלני אם מרצונה תגרש הגוף ותלך? ואם תשיבני שהיא מוכרחת לצאת מן הגוף ברצון הבורא ית', בעת אשר יקרב לשחר (לשחת L) נפשו להתהפך כחומר חותם, והפרידה מעידה שתצא מן הגוף שלא ברצונה. בראותנו הגוף מצמער ומתגולל ומתאונן ומתנודד במרם תצא כפרידת שני אוהבים, ועל כי כל החיים יודעים (יודעים) שימותו ומתפחדים מן המות, אחרי כן תשיבני, אומר לך מאחר שברצון הבורא פירדתם ובעל כרחם, למה תצא זאת מלפניו להוציאה מן הגוף ובחבלים ובקישו, והיא בלם ובנחת ובחכמה בלא הרגש להתחבר עם הגוף, למה תהי' הפרידה בכבי ובאנחה, והיוונג מתוק ונחמד? ועוד למה יניחם להתפרד, כי נקל וערב לשומרם יחד ולוונגם, ולעשותם שניהם כאין? ועוד כי יש להם מתינות ישר להיותם יחד, ואחר שהפרידה אינם מרצונם, כי יש להם חיות יחד והנוויה (והנאה?). מאין תבוא שלא יעמידו יחד לעולם? ואם ברצון הבורא ית' היא זאת, עמוד והתבונן מפלאות תמים ידעים, ותשכלני איך בעת הקץ תהיה הפרידה קשה עד אשר נלאו כלכל ולא יוכלו לסבול: ועתה לשאול הקשתי, ועל כי העמקתי לשאול עונג מצאתי, אם כמשוא (כמצוא L) לך תתענג כמו בחמי מנית ופנג להפוך בו ולחפש בו עד תומן, הבא עד תכליתו להבחין הספק מלבך: ותחילת החיפוש באיזה צד ישען ויתחזק הגוף בכח הנשמה למצא מעמר אורך בחיים, כי יש נופות שאינו משעינן ומעמרן מכח הנשמה, ויש נופות שפעמים יתגרנדו ופעמים ינחו: על כן יש לדעת שהנשמה כאשר יבש (כח) כח הגוף תאהב ובההבת' אותו תסעדנו ותחינו, ופעמים אשר לא תחפוץ קרבתם ולא תשכון בהם, לבעבור כי מצאה בהם דבר שתברח מהם, על כן לא תחום לה עליהם (להעלותם L) מנופו לפי שזה אוהב(ים) אותו על דרך אהב, לפי שדומה לה בראו מדרך התולדת כשהמצא בהם מתולדתם, והם הגופות בעולם השפל, והם נבראו ממהות ישר המורכבים מ' הבורשים (השרשים L) שהם אש מים רוח ועפר, וכל מה שהיא מוצאת אותו בגוף הוא דבר שוה או קרוב לשוה, על כן הקרבנו ותשכון בו, כי

היא נגזרת מנשמות עליונות, על כן תאהב דבר לשוה וקו המישור שהוא גוף האדם: וזה גוף צריך שימור מ' השרשים שלא תעדיף בו תולדת האש על שלשה הנותרים ותתנבר עליהם, ושלא תעדיף בו כובד העפר, כי לכל איש קצב וזמן ידוע לחיות כפי רוב חסום ולחות התולדות, לא אש זרה ולחת נכריה כי היא הפך התולדה, ובכל עת שתמצא הנשמה הארבע שרשים שהם שוים מבלי התנבר זה על זה, או קרוב לדרך התולדות, היא בהם תתענג ותשכון בהם: ויש נופות עוד בעולם השפל שאין בהם דבר השוה, ולא דרך התולדות בהם, והיא כאבנים ועצים שלא יתבערו: ויש נופים שהם בעולם התיכון שהוא שמים שנקראו ככבים וסולות וסאורות, והם שוים בתולדותם, והם נשמות ולא תחילנה ולא תכלינה, ולא תמצא בהם מנוח לגרנד כחנעתם, יש בקו השוה, יש שבים אחורנית ישרים במרוצותם, יש יורדים יש עולים, יש מהירים יש מתאחרים, על כן נופות בני אדם לפעמים הם שוים, ופעמים יסעו מן השוה שבהם, ופעמים יתגרנדו ופעמים ינחו: הנשמה תמצא מהם לפי ניתוק מוסדות ותעמוד בהם לפי נוחם והשקטם, וכצאתם מן הגוף האש המורכבת תשוה אל האש, והרוח אל הרוח, והמים אל המים, והעצמות שהם קרים ויבשות ישונו לעפר שהם ממתכונותיה, והם מוסדות הגוף כקורות שהם יסוד הבית:

[איך הבריא ישתבש יסודותיו וינהקו סבראותיו? דברך טוב לי מפת פתיע (פתים L), מופתי עת מוימות עצמות פצחו ורסן מפני שלחו: ועתה דודי לא אהיה על שמדי שקמ, עד פרט כרמך אלקמ, כי כרם לדודי בקרן אשר (אשר) נמצע אורו, ותהי לנפן פוריה לאשר פקו פליליה: והואל נא והשכילני איך יפרד אדם תחילה סבראותיו אחרי אשר אמרת שנברא במתינות ישר וכחזוק ארבע השרשים, מעמרם מחבורם טובה, ומורכב הגוף לנשמה, ומאיזה דרך סבת פרד בריאותו?

לנכדי אמתיק סודי, הלא הוא כמוס עמדי, חתום בלבי, להשיבו נקוצה, ומזממי לא יבצר, ושים לבך לדעת כי כל דבר המשחית דבר אחר מן הנשחת ישחת, כמו אתים וקרדומות ומקבות וגרון: הלא תראה הגרון כחשובך עץ להפריד חלק אחר לכמה חלקים ומשחיתם ומפרידם והודו נהפך עליו למשחית, כי בפעולותו יהיה קחה הברול ונהפך צורתו, וכן את במחרישה, וכן הסכין והמאכלת בבשר ובלחם, שאינם ישחתו בפעלם ואו הם משחיתים, כי כן דרך כל דבר הפועל באחר, האחר פעולתי בו: גוף האדם פועל במאכלתו ובמחיותו, ומוחתו לכשלו בקורקבן, והמאכל פועל בו להחליף תולדתו ומוסדותיו על דרך ובוסלו המוחנות: אם תולדת המאכל נהפך ע"י כלי הגוף, תולדת הגוף נהפך ע"י המאכל, וזכר לדבר, כהתימך

שודר תושב: ואם תרדק בזה, או המצא כי כן דרך כל דבר, ועל זה הדרך יקרה אם הנשמה תחפוץ לגדל הגוף ולסעדו במאכליו ובמשחיתו, מן המאכל עצמו תהרסנה:]

מה.

למה השבע יתאב לאכול בזמן מועט?

דודי, את נכרך האמרת, נכבדת בעיני כל ויקרת, ועתה אחרי כל זאת יצא ספיק כי הנרדף נהדף (נהפך ל?) לרודף והנשחת למשחית, ועל זה הדרך נהרסו בניינו הגוף, למה אדם שבע אחר זמן מועט (יתאב) ירעב ויתאב למאכל?

נכדי, גם זה אוכל להנידך, כי סמונה ומצווה גדול זה דרכו, לבעבור כי כל דבר חיוש בו תולדת אחרות הברורת והידוע' אשר תבערנו ותעמידנו בחיים, והוא בא מרוח כדת חלקי הגוף הגדול והנבור שבין חלקי הגוף מיושבים ומיוסדים מארבע השרשים שהוכאו מחוץ הגוף, שהם אש ומים ורוח ועפר: ואלה הארבע שרשים זה דרכם מעשה להשחית מה שימצאוהו בגוף בחוץ: ראשונה, כמו הבשר והם מופחוחו ונדלוהו ורובוהו ורוממוהו, וכאשר בא לגוף ניתוק הרם מן אילו הארבע השרשים ולטרסם מסתכונת הבשר (הישר MS): על דרך זה יבואי התינוק (הניתוק ל) והסעד, כי מן הניתוק והפרידה שיקרה לגוף יקרה שיאבד דבר המסעדו ומעמידו שהוא מתולדתו, על כן כשימחוק הדק המאכל בגוף ונשחת צריך שיחמו, ויאכל מעט כדי שיעדיף מה שיאכל עתה על מה שאבד והיא הנמחן: על כן אמר האומר, מי שלא יתן מה שיאהב לא יקח מה שיחאב, והוא הגוף, הנותן מעט ממה כדי שיש להוסיף במאכל; וזהו אחר הפרידה והניתוק, שאבד ממה שקיבל גופו וצריך שיחבר בו מצד ממה שאבד ומה שיכניס בו דבר שיהיה פן יעדיף על שבעו, ושלא יאכל מה שיתעב, כי בשנוי מן השוה יקרה פירור החבורה; ושים לבך לתשובה, ולא יספ עוד לדאבה:

מו.

למה החי ירא מפני המה?

כל עצמותי למעצותיך הסכימו, ושמעו אמריך כי נעמו, ומהם על דרך התולדה נעלמו, למה החי ירא מן המה אשר בנפשו מחובר בעודו חי? ואחרי אשר מה, הלא אהבתו גם שנאתו כבר אבדה, ומה יוכל לעשות לו?

ויען דודי, ממת החיים, ומחיה המתים, נטע שכל בלב כל חי לאהוב ולקרב דבר המעמיד תולדתו, ולשנא מה שיהרס ממחכונתו, ואין דבר המעמיד חיות כאהבה ומהרסו כשנאה:

ויומר נכדו, זה לא נעלם ממני, ומה השיבני? ויען לו, תשכיל ממוצא שפתי אשר הודית כי כל חיות אוהב חיות, והעמדתו לעולם, וכ"ש האדם אשר הוא חכם סחכמת העליונים והעמדת שבעולם: והחיות נקראת חברת הגוף והנשמה, על כן צריך שכל חי יאהב חבורה כזה, ואחרי אשר יאהב החבורה, איך לא ישנא הפרידה? ומשנאתו הפרידה ישנא המעשה, (ומה המעשה) ומה הוא המעשה זה הגוף, שרואה בלא נשמה: ושנאה זו לא מפחד שידע זה הגוף, כי שומה שבשומים לא יחשוב זה, אך השנאה שתוכור לו הפרידה, על כן חכמים כינו זאת שנאה, ולא פחד:

בזכרי אשר אמרת על סבוב המים בעיגול, אם זה אמת, אין מקור בעולם ואין מעיין אשר מסנו פרידה, אשר יקראו לו הערביים (מ) מעיין אמרתי, כאשר סובב סובב לשוב מסילה הראשונה:

ויען דודי, עתה שאילה קשה, מוסיפתך עד תכונה הגישה, וחכם לב יתור ויחפש בחדרי מומוהיך, כי יש אשר יעמול לבקש ולא ימצא, באשר המים הסובבים אין לנו לקרא אותם לא מקור ולא מעיין: ועתה להשכילך אמשול לך משל להבייך: הנה לחלוח הגוף אדם המזיע נקרא נויפה: כן יש לומר ליחלוח האדמה אשר תתלחלח בהרכה מקומות שהם רפיון, וממנה יצא טיפות, והוא מקור בארץ כאשר מוסדותיה יש ליהות בעולם אשר יעלה ממנה איר בחימום השמש, ותתלחלח ותזיע סחלק ד' מוסדותיה: כי ידענו כי לא תשקוט הארץ מלהוריד (מלהזיע ל), ויתחברו הטיפות אשר יצא מהן מעיין: ומה יקרה מקרה הארץ, שמענו שאנינו (שאם ל) יצא בעת החום ממנה ליהה מעט (זיעה) כי יחרב ויבש מחוס העליון הנקרא שרב, ואשר שחו מהם פעמים באו אל גבים ולא מצאו מים, וכבוא על הסתיו מסוב הארץ ולחלוח הארץ ישונו המים לקדמותם:

מו.

מאין יבואו מים חמים ויצאו מן הנהר?

בתנומות עלי משכבי דברתי אני אל לבי, וברוב סעיפי בקרבי, דרך עוצב בא בי, כאשר למדתי אורחות הנחלים ומליצתם, והשבים על עקיבתם, והיוצאים בהר ובקעה: אך על מים חמים לא ארע מה זה ועל מה זה, כי בהיותי במבריאי רחצתי במים חמים, והוא נהר גדול, ולא ידעתי עלילתם וסיבות חוסם, על כן שפתי ידי למו פי, ולרבר בכך עד תודיעני סבת הדרך: ויען דודי, גם על זה אשיבך, ולא ארפך ולא אעזבך, כי כאב לתת לחכם ויחכם עור, אם אתה נהנה אין אני חסר: הנה ידעת כי כל הארץ מזורות מקורות כאשר הנרתך, ומוציאים למיניהם העזבות סביב

סביב מקורות זהב וכסף, ויש סביב נחושת וברזל ברזל ועופרת, ויש ממקור מחצב האבנים, ויש ממקורות הגופרית, שהוא מין עפר ההנפש אשר וריחו פורה, וירוק, ולהבו כתכלת, ובעלילתו יהיו מים חמים, כי כאשר יצאו מצדם מעיינות כשמניעות עליהם מתחמים בדרך סיד בהשליכך מים עליו, והם מרפא לנפש: ואם לא תאמין לדברי זה, לך במקום אשר ירחיח המים ירחיחו גופרית, והורה על האמת, ואז תמצא אחרית:

מת.

למה יצאו המים מכלי מנוקב אם יסתום?
אל יחר לאדוני ואדברה אך הפעם בתולדת המים, כי עוד יש ספק בהם: הנה כאשר נפרדנו מרעמסם ללכת כל אחד לדרכו, לא נחתי עד באתי לצידון, ונתאחתי (ונתארחתי ל.) בבית אשה גדולה: ויהי לעת האכל בא אחד מעבדיה אשר יוצק מים על ידינו בכלי מופלא אשר בתחתיתו מלא נקבים, ומנקביו יצאו מים לצקת על ידינו, והיה בשימו בהם ידו בנקב שבראש הכלי עמדו המים ולא יצאו, ובהסירו ספיהו יצאו: ובראותי זה, אמרתי כי האשה בעלת הבית מכשפה, כאשר לסדה כן עבדיה; הרבר יצא ספי, כל השומע יצחק לי, ואני אמרתי להם למה עלי תלעינו? אך אם תרעו מעם הדבר, הרוני ואני אחריש, ואין אחד מהם נלה אווני על זה; ועתה ארונ, הודיעני אם שנית בקוראי [אותה] בעלת כשפים, או סררך התולדות יבוא זה, כי הרבה ינעתי זה לדעת, ולא מצאתי:

ויען דודו, יאות לו להיות כפות מחויק חכמה למכשפות, מחכמות בעלת הבית לא יצא זה, ולא מתכמת עבר אשר יצק מים על ירך אשר מן מוצא כלי למעשהו כזה בראשונה: הלא שמעת כי המוסדות הנקראים שרשים, והם אש ומים ואויר ועפר, ארחי לחברה, ולא תמצא פעולה כי אחד לו הם (לא הוא?) פעולתה, וכאשר ירחיו יפעלו דבר אחר, בעבותות אהבה יקשרו עד תום הפעולה, ואין מקום ריק שלא יהא אחר מהם, ואין אחד מהם השרשים קרוב גואל למים לבוא במקומם (כמו המים) יותר מן האויר, לפי שהמים כתולדות האויר נדים ולחים, מה שאין כן באש, כי אם היא נד והוא יבש, והעפר אינו נד: על כן ראוי שיבוא האויר במקום המים הנד והלח כמותם, וכשהמים רוצים במקומם (רוצים לצאת ממקומם ל.) ויפנו לדרכם צריך שהשני הדומה לו, הוא האויר, ימלא את מקומו סיד: ואם יסתם ויבא השני אשר יראה לבוא במקום חבירו אשר יאהב ולא יכול לבוא שם, אותו אשר ירצה לצאת לא יוכל להפרד, כי לא ימצא מוצאו: והנה העבר אשר

יצק בתתו דרך לאויר ליכנס בכלי או יצאו המים ויכנס האויר, וכאשר סתם כניסת האויר מלבא אל פי הכלי להיות במקום המים, או נפשו קשורה בנפשו למלא את מקומו, איך יצאו המים מן הכלי? כי לפי כניסת האויר יהיה מוצא המים, רק שיהיו הנקבים בסדה שלא יהיו רחבים מלסכול כובד המים:

חכם לב יקרע מלבו סגור להכניס בין אשר אתו תחתיו סגור, ואשר ראש דברך רצץ, ימלא פיהו חצץ, כאשר כולם נכוחים לסבין: ועתה דודי, דברנו על האש ועל המים ועל העפר: ועתה על הרוח אחברה מלון, ואדברה ויריח לי, כי רוח הציקחני לרעת מאין יבואו הרוחות, ועתה הנבא אל הרוח:

ממ.

מאין יבואו הרוחות:

ויען דודו, לא נביא אני, אך תולדתו לסדתי, קצת סררכיו נתיינעתי, ואני לך ולולתך אניד את אשר ממני לא נכחד, לא בסחיר ולא בשוחד: הנה הרוחות באות קצת מן הארץ וקצת מן המים הנראים לעין, ולא מן התהום: כי השמש בהתהלכה תחת הארץ בלילות יתחמם גם הארץ, ומן המקומות הרפויים יצא לחלוה וחייסום, ואד יעלה מן הארץ, ומן המים אשר יתחממו בלילות סכח השמש והכוכבים: גם בשוא גלי הים ישנעשו (יתנעשו ל.) מימיו, וירבה האויר העולה וירום ויתנשא למעלה כסראה עשן, והאויר עב, והנה בהתנשאו יתנרנד אנה ואנה: ואני קראתי על זה הרוח אויר עב, ולבעבור כי יש אויר נך, והוא אותו הקרוב אל הרקיע, ובאותו אויר אין רוח, מן הרוח הקרוב לארץ הוא המתנרנד, כי בשעה שקט אין רוח:

ג.

מאין יבוא נרנד ראשון הרוח?

ויאמר נכרו, אם כדברך שהרוח נרנדו סכח אחר צריך שהאויר יתנרנד כשהרוח יושב: ועתה ראה אם תמצא אויר שקט ואם אחר מתנרנד או שקט, ואם הוא שקט מכל וכל, לא ינוול שלום אחר לנענעו, א"כ המתנרנד סכח אחר שהוא עצמו מנורנד, ואותו אחר משני, ואותו שני משלישי, ואין קץ לדבר, א"כ יהיה נרנדו האויר בלי ראשית:

ויען דודו, הלא ידעת כי האש בתולדתו קר ואין צריך להנשא סכח אחר: כן זה הרוח, שהוא אויר, נרנדו מתולדתו בלא סנרנד אחר: ואם תולדתו שקטו, נמצא שזה האויר המתנרנד סכח אחר יתנרנד מאותו שהוא שקט ולא מנורנד, כי תולדת האויר המתנרנד האויר היא מנרנדת ומנענעת, והוא עצמו לא תנוע ולא תנוד באשר היא שקיפה ושלויה:

נא.

לדעת אם דבר קטן (קנה אם) יניד אחרים, כי המניד איננו רק: ויאמר נכדו, ראה אתה אומר אלי כי החולדת לא מנדנדת, איך תנדנד אחרים, ואם היא שקימה? על זה יצי בעלמא, כי אותי דבר אשר ינוע וינדנד אחר יתנדנד בעבור נדנדו יניד הנד ממקומו וינוח לשבת במקום אחר כשנתחיישב, ובאותו מקום נל ינד הרבר אשר נמצא בעבורו: ואם כן, דבר דק אשר לא יחולק סרוב יצנו כאבני השרה כשיתנדנד, הודיעני אם כל הדומים לו מתנדנדים, כי אין נוף דבר שאין לו מקום, כי לפי מה שאמרת יניע אחרים כבלי קץ, ואם אמת הרבר כשהרוח יתחיל לנדנד אין קץ לניעונו ולנידנדו:

נב.

ועוד מאין יבא שבת והשקם?

ויען לו, נכדי אורו בכוכבי נשפו יפלק נתיב באפן, כאשר לדעת ידבר וחיללים ינכר: אמנם הרוח ימצא קץ לניעונו, ועוד אני מחזיק בדברי כי כל דבר הנע והנד ינועו אחרים וינדנד, אך זה הניעונו לא יהיה באורך מן הקצה אל הקצה, אך כוכב לחזור בעינו עד מקום שממנו יצא לנדנד, ונדנד הרוחות הנה הוא בעינול ידמה לנדנד המים הסוכבים בעינול: ועל אמרתך אם התחיל לנדנד אין לו קץ, דע כי ימצא קץ מנשיבת הרוח אחר אשר זה יקרא לקראתו ויהדיפנו ולא יעבור: ועל זה הדרך סיבת אבני השמש והרוח, ינוחו נדנדוים בעינולים, וזה הרוח אשר נצחו בהדפו יהיה מוכרח לנדנד מאחר ממנו אשר נצח אותו וזה סיודד עד עת קץ: כי כל רוח דוחף אחר אחר, ומה יקרא כשנדנדוים מופידיים במים ממקומות צריך שזה יצא לקראת זה, עד אשר יהדפו יחד ומטהרסם ימצאו מנוח ושקט, העת כי כאשר זה את זה יפגעו נחו כאשר ינועי, וזה נבול קץ הרוחות למצוא מנוח: ומהדפת אבני השמש הסוכבים בעינול הוכל זה לדעת כי הם נהדפים מכח אחרים ההודפים, כי בדבף קטן כמו אחר מהם לא יהיה נדנדו לכלם, והנדנד שהתחיל ימצא קץ באש-הנדתיך:

הנה לך מליצת הדוד אל הנכד, והמליצה תוכן, כן פי' אבן עזרא בפסוק סוכב והולך, כי הרוח סוכב והולך באחרונה, ועל סביבותיו שב הרוח, כי המפרש כי רוח פיאה וסוכב על השמש אין לו מעם, כי היה לו לומר הרוח, ואיך יאמר שב הרוח, אם היה הרוח הוא השב: והרוחות תלויות בשמש, כי בהיותו בדרום ירכו הרוחות הדרומיים, והצפוניים בפאת צפון: והכמי המלחים יודעי דברי הרוחות ממקום השמש,

והנה מצאו בראיות נמורות כי השמש סוכב סוכב, כמו שאומר קהלת וזרח השמש עד אל מקומו שואף, ואחר כך סוכב הולך הרוח, שהוא הרוח בעצמו, ובאחרונים המים, כל הנחלים אל הים וכו' עד הם שבים ללכת: והנה הם שלשה מן ארבע העיקרים, שהם אש ומים ורוח, והרביעית הזכיר (הזכיר ל). כבר, והארץ לעד עומרת: ואילו ארבעת עיקרים נזכרים במקומות, ולא ישים איש אל לבו: כי בראש ספר בראשית הזכיר תחת אש שמים, והאוויר הוא הרוח, ובמבעת השמים ואת הארץ, ורוח אלהים מרחפת ואחר כך על פני המים: וכאיוז, לעשות לרוח משקל ומים תיכן במדה, כי הוא לקצות הארץ יביט, ומי תיכן את רוח ימי: ובמשלו, מי עלה לשמים וירד, מי אסף רוח בחופניו, מי [צרח] מים בשמלה, מי הקים כל אפסי ארץ: וכן בקהלת כאשר הזכרתי, וזרח השמש: וזה הזכרתי לחזק דברי הספר הזה אשר שמו חכמי לב לדבר על דברי התולדת והשרשים, ולא רק הרבר כאשר מהם הכל נברא ומתכונתם:

נג.

למה הרוח מנשב סביב היישוב יותר מסביב הרקיע?

אשר אל אמרתך לא שעה, בעתתו רוח רעה, כאשר נגלה לך במדות עמוקות, על כן עם דעתך יהיה לכבי מוצקות, ועתה השכילני למה הרוח מנשב סביב היישוב יותר מסביב הרקיע, כי אמרת באוני הרוח מתנדנד מתולדתו ומתולדות הדומה לו, ואם כן לא יתנדנד למעלה ממה שתולדתו שואלת: על כן הגיד לי שהרוח סוכב סביב היישוב, אם אוהב פרידות מקומו, או אוהב מקומו שהוא הארץ, והמים שמהם יוצא, כאשר אמרת: אם אוהב מקומו, למה יפרד וירום מן הארץ כלל? ואם אינו אוהב מקומו כלל, למה לא יעלה עד לרקיע?

ויען דודו, אם בא נכדי לחקור תולדות הרוח לדעת שבילו, ובלבבו יבין ושב ורפא לו, כי שאילתך מחוסר דעת התולדות, הלא כתבתי שברוח האוויר בא מקצתו מן הארץ ומקצתו מן המים, ועוד נוסף מתולדת האש לתת בו קולות, וכשהתולדות קולות ירבק בו יתקרב לאש שהוא קל כפי יכלתו מכל הליחות השועפות (השופעות ל). בו, והקרה לא יעזבוהו להנשא, והם המים והעפר: הנה יש בו תולדות המכבידו בעבור הקרה ועובי הליחה, ויש בו תולדות להיות קל בעבור חומו: על כן כשצריך שיתנדנד ואינו יכול לעלות בעבור כובד הליחה, ולורת לא יוכל מפני הקלות מחום שבו, ותמנע להיות מרחף על פני המים וסביב היישוב: ואם יש לבך להקי' אלי תשוב מחום שבו:

נד.

מאין חוזק לרוח להשמיע קול?
 אמרתך נכספה לי מכל כלי חמדה, ובפוקדי אותה שמתו פי חרב
 חדה, כאשר הודעתני מקור הרוחות ונדנודים והרופס (והרופס ל.) ומעמדם,
 ואתמה מאיין יתחוק להיות מפרק ומשכר סלעים ובקול קולים כזה ירעים:
 ויען דודו, נכדי, עיני עליך חסה, ואם נדר אנניך נהרסה מסערת
 קמב, ולא ידעת מאיין יבוא חוזק ואומץ לרוח להפיל גדרים, אך דע נא כי
 חוזק הרוח בא מכבודו ומסהירתו כשנסנר זמן ארוך בארץ ולא מצא
 מוצאו, ובמחו (ובנחול. ל.) שם העת שוקט וכבא זמן צאתו, כי לכל דפריש
 (הפורש ל.) קץ ותכלה, לא יצא כי אם בחוזק, כאשר האריך זמן חנותו,
 ימציא רעם בצאתו, ואם שבמו (שבתו ל.) שם מעט יוצא משם בנחת:

נה.

זאת מליצת הרוד והנכר:
 ובעל הפרחין בא אל נכון להרחיב מליצתו אל העם, כי כן פירושו:
 האד כשיעלה מן הארץ לא יעלה ססלע ומהר קשה, ולא מארץ נגובה
 ובישה אשר תשלום בה דריסת הרגל, רק מסקומות רפיון באנשים ובאחו
 ומצירי הארץ: כי השמש כלילות בהתהלכו תחת הקרקע מחממת גם
 הארץ, והיא עצמה כמין מימ, על כן יעלה ממנה אד עב ומוליכו הרוח
 לכל פינות העולם עד שיהיה כמו בנד חוק, ומנדנדו כספינה, ומאותו
 נדנוד יהיו קולות ורעם: ועוד שמעתי שהגשמים שהם ברקיע אשר למעלה
 מאותו רקיע שהוא מאור העולם, כשעושה חום גדול, והרקיע שלמטה
 נתחמם על ידי החום, והגשמים נוזלים עליו מן הרקיע אשר למעלה המינו,
 ועושה תוך תוך כאלו ברול שהוא מתלבן ע"י האור, וזורקי עליו מים
 ועושים תוך תוך: ותדע שאמת זה, כי לא תראה שאותו קולות יבואו
 בעת החרף כי אם בעת הקיץ, ולעולם אחר המימות גדול וקרוב לגשמים,
 ואם בחרף, יארע ע"י חום במקרה אויר מנותק, אך על זה לא הוציא
 בשפתיו, רק על הקול והרעם, ולא דבר על האף הרוחות:
 ועתה אחזור למליצת חכמים אשר פירש הרוד אל נכר בעניין זה:

נו.

מאין יצא הקול והרעם?
 סודי גדולי חקרי לב ולא מפש כחלב, אך הדבר שלא דרך בו
 אדם ולא נכנס בקירות לבו, והם הקולות והרעם מאין יבואו: הירעת עת

משמרם בארץ מאין בא אשר לקולם יפחד ההמון, והסמר שערת בשרם,
 ולא העמים לבר, כי נס הנהמות הבריות (הבחיות ל.) בשומעם ישונו
 לביתם, והמדבריות תחת האלים יכופחו, והעופות יגרשו האויר ויתחבו
 (ויתחבאו ל.) בחורשים ובסבך הענפים ויש רבר אשר שם מלנו בעצם
 אחר ובעצם מן העצם לעשות מלאכתו, והם מרגליות הנלעזות, פיירלש", והיה
 בשומעו הקולות במרם מלאכתו יכלה יעזבנה, וציים (וינוס ל.) להתחבא בתהום
 ולא ישוב עד אשר הקולות יחדלון: ועתה המיבינתך תוכל לדלות זה להודיעני,
 והיית יחיד בארץ לדעת זה, או מחשבותיך עם שאר עמים אשר זה לא
 ידעו, ויהי הקשר חוק ואמיץ בהיותך נספח עמהם:

ויען דודו, מה לי כי אחרי דלקת, ומה לך כי אחרי נזקת? הנה זה
 מטה חכמים שבר, על כן קשה להגידך, אם לא ישיאך לכך להאמין: אך
 אם אלי תבין לכך, תדע במרם שכבך ולקראת דברי תכון, מפר (מכל ל.) צוק
 ישכון: אמת הדבר בלי ספק, ובלי לב דופק, כי האויר אשר בא מן הארץ
 מתולדת ויעתה ירום ויתנשא מן הארץ, זה תוכל להאמין במראית העין,
 שאד דק ויש עב ממוצא (ממוצע), ויש יותר עב ממנו, ויש עב מכל וכל,
 לפי מוצא ויעת הארץ אשר התהלח וכי יש ויעה עבה כמו מימ, ויש דק,
 והעבה מכולם כאשר תתנשא למעלה במקום נבזה הקור היוצא מן האויר
 יצמינתה עד שתשוב הויעה ותהיה ענן, ואם קרת האויר יקרה ויפגע באד
 שהוא ויעה עם קורת הרוח תהפך האויר שבא מן הויעה (שבא) לקרח
 גדול, וזה הקרח הבא מן הקור ירחיב להתפשט באויר ומעמדו מן האויר
 התחתון המנשא לא ישבר: ואם יקרה שרוח חוק יפגע, או בימות החמה
 חום בלא רוח או ימים אותו הקרח בחוזק החום, או תשבר ברוח חוק,
 וכשהרוח יחמר לה ולא ימצא מעמד או ימס ונופל: וברעת הלב תדע זה
 עם מראית העין, כי בעת הסתיו בבא הקול תצלנה אונך כאשר
 ישבר בחלוק, ובעת הקיץ כמו כן תמס אונך תשמענה: ואם מאלה הדברים
 יבוא הרעם והקולות אל תתמה על החפץ, כי העננים תיכל לראות במראית
 העין, והקרח בעין הלבבות תיכל להבחין מקרת העת הבא מן הרוח והתמס
 כמו שהוא ניתק, יראה לך שאין הרברים המזורים זה לזה, כי זה
 תשמע באוניך: ולמה זה תבהיל ותחרוק שן ותקפץ עין מדאנת זה הדבר,
 ותנוע כשיכור והרחיב פה כאשר מעט נופל (תפל. ל.)? אכן ידעת מי הוקיך לך,
 זה חוסר התילדת, אשר עצם עיניך מראית, ומך לכך מלהבין, כאשר
 רבים נכשלו: כי הלב אשר מעוטף מן סאפל, ואם לא יבא אל נכון, ותמיד
 ממשש כעוור כאפלה, ולא יאמין לדברי חכמים הרואים בעין הלבבות
 ובעיני הכוחות: על כן תביט בעניין התולדת, לדעת אשר תבא

אל נתיבותיו, ואל תהיה כאיש עצל, אשר לא ירצה ללמוד דעת, כי נכרה עליו העבודה, כאשר מצאתי רבים באמרי להם דבריי, לא שמעו ולא הפו אונם, אך יצא לחוץ מדברי כי לענם ככל הארץ, ויאמר מהתלות בדרך לחויו, ואם תנוע אחריהם גם אתה כאחד מהם:

נז.

מאין יבא הקרח הנקרא „נריילא“ אחר הקולות? ויען נכדו, שומע אל אמירתך גל, וילענו למו עמל יכסיומו: ומאבהתך אותי תיסרני, אך אל תחשבני לעמל, כי בא אלי כחי סבורתי לבי למלאו בין ודעת, וישרו בעיני את הדברים אשר אמרת(י) על דברי קהלת ותולדת האור (האור ל): אך על זה הקרח הבא מן האויר כאשר הגדת(י) לי, לא אוכל להבין ולבוא עד תכונתו, ואיך יוכל האויר לשאת אותו, ואם ישבר כאשר הגדת לי, לא נראה השברים רחבים:

ויען דודו, צדקת על זה מסני, כי קצתתי לך על זה לשוני: אך עתה פלס מעגל הקרח ועלילות סיבו(ב)תם ומראשיתם הבא אחריתם: המימך ראית אחר שום קול רעם קרח הנלעז „נריילא“:

ויען הנכד, כן דברתי ברוב פעמים כן ראיתי:

ויען דודו, הנה לפעמים ראיתי קרח כפיתים שהבהסמה והאדם סתו מרירתם (מירירתם ל) מן האויר; ועתה הידעת למה זה, ומאין בא אילו פתותי קרח הנעלו „נריילא“? אך מספפר פניעת העננים ישבר האויר הבא מויעת הארץ, ושוה (ושבה ל) לענן ונהפך לקרח; וכהשברים יודק ויוכת עד אשר דק, וביורדו על הארץ אשר הוא קיצם, אם ימצא האויר הסמוך לארץ סזונן, וקר הרוח אותו כפור כאשר יפור כדמות קרח הנקרא נריילא, ואם האויר חם, יסחו פתות הקרח וישבו למים, ולא נודע לכריות שהיה זה רק מים: וסוה יקרה כי מטר, או פתות קרח הנקרא נריילא, יבא אחר קול שכירת קרח: ושוה בלבך זה, ואל יהיה עליה למורת, כי לא פיתים קטנים הם באויר נולדו כאשר תראם יורדים שישוב, אך קרח היה רחב על ראשינו, ומהדיפת האויר ויודקו כדמות אשר תמצאם על הארץ, ולפי חום וקר הארץ יעמוד:

נה.

מאין להט כעת הרעם?

שפתו חכמים יוורו דעת, ואני להמריחך לרגעים, ופעם אחר פעם, צוף ורכש אמרי נועם: אתאו אשר מהם תחי נפשי, אכלתי יערי עם דבשי: על כן השכלני, מאין יבוא עת הרעם להט אש וברק אשר יאיר תכל,

ותחת כל השמים יבימו כירודי אש יחמלמו? אמנם הרבה שמעתי אשר האריכו על זה לשונם, אך לא עמד מעמס, על כן לא אצדיק דבריהם: ויען לו, ואת השאילה אשר משפטם לבוא כחצר החכמים, ותיגע אליהם מהיכלו, וחזק תולדות הדבר המאיר לעין הבא מראשיתו: כל פניעת שני דברים הרצים זה לקראת זה בעוצם מרוצתם בעת מקרה הריפתם, יצא מהם ראשונה הקל בתולדתם והקל הנמצא בתולדת העננים, והנה הוא האש, כי הם מורכבים מארבע שרשים, והנה הקל בכל הגופות והו שורש האש: על זה יצא אש כנבורת דחיפת הגופות יחד, ואורו על כנפית הארץ, וכאהיל (ובאוהל ל) האויר הממוצע, בינינו הרקיע פגע, דחיפת הגופות שהם העננים, אשר מסחברת פניעתם תצא ברק ולהט אש:

נו.

מאין יבא שריפת אש אחר הרעם, ולמה לא נופלת חדיר?

ויאמר הנכד, למה (לא) סכל קולות והרעמי לא יצא הקול אשר תוצב להבות, ומגיע עד האויר לשרוף ולבקוע הנקראות „פולדרין“, כי הרבה קולות [נ]שמע זולתו? ופן תחשיבני לסכל, לא אחריש, פן תתפאר עלי לאמר, דחיתוך בקש:

ויען לו, הנה בעיני לי אורב, להיות נוטה כמדקרות, אך מקולך לא אחת, אם אישיך בנחת, להתיריך מקשר הסכלים, לתת לב בתכונת שכולים: אין קול כקול רעם הנקרא פולדרין, אך הם מחולקים לשלשה מינים, ואין רק אחד מתולדת האש: יש אחד בוקע זכורת כל דבר אשר יפגע, השני שורף כדמות ברזל השורף, השלישי משבר כאבן, ומתולדת שינוי אילו השלשה תבין כי מפגע הדפת גופות אשר יפגיעו ופעמים יצא האבן, ופעמים אש, ופעמים אויר; אם פגעו הגופות אין רק רוח, לא יצא רק אויר מהם שיש בו סכנת מות כשירד על יישוב: ואם פגע מקרה הגופות באש אשר יש בו העננים קרח, כאשר אמרנו, וההכאה יהיה גדולה בפניעת, תצא מהם אש שהיא קל בתולדותם; ואם ההכאה מועמת וחלושה מפניעתם, תצא כעין אבן, אשר חכמי יון לועים אותה „צרליאון“, ודמותה כעין צבי ואיל, והיא מסחברת קרח:

אלה פליצת החכמים: ואני המעתיק אומר, הנה מצאנו כתוב, מבטן מי יצא [הקרח], וכפור שמים מי ילדו, זה היה אומר השם לאיוב, לא ידע בלא אלה: אמנם בדברי אליהו כתוב, מן החדר הבוא סופה, שהם הרחזות, יבא הקרח במוצק, שהוא האויר העליון: ואין ראוי להאריך לאיש נרעב ונאלח גדולה וקטנה מדעתו, כי גם זה אשר כתבתי עברתי על דעתי, אך לדעת תולדת האויר כי נאלח ונתעב, מפרשי ע"כ:

D

מאין יבא חווק לרעם וברר לנקוב שום דבר ?
 אחרי אשר בתולדות הקולות התחלת אלקמה נוספת, מאין יבא חווק
 ונבורה אשר יוצא מפניעת עננים, אם (עם L) אש, או אויר, או אבן, לעפר אויר
 עב במהלך ארוך ולרדת סביב הארץ, ולפעמים שובר ארוזים, ומפיל מגדלים,
 ושוורף בתים, ונוקב עובי הארץ, ואין מי יעמוד כנגדו ?
 ויען, כתר לי זער ואחיד, וממוצא שפתי ארויך : דע נא וראה, כי כל
 דבר הפוגע בדבר שיהא לו מעמד לקראתו ונוקבו ומשברו, זה בא לו
 במהירות מהלכו יותר מחווק שיהיה : הלא תראה במלחמות כי מרוסח קטן
 בלא ברזל ינקבו הרוכבים מן עב ? ולפעמים סוס ורוכבו נמצא שמשחירות
 רכבו בא זה אשר תועיל בו יותר מן החווק שיהיה בו, והמהירות תביט
 להתערב לפי כח הוורק : והא לך סבת שאילתך, לבעבור אשר תגדל הכאת
 שני הנופות, המהירות והפירור (sic) יש כיוצא מן הפגיעה יכולת לנקוב
 אם אש, או אויר, או אבן :

סא.

למה לא ישמע קול הרעם קודם ראיית האור ?
 מאשר אשר השכלתי, לבי רוצה אך מן הקצה אל הקצה : כי באמרך
 מחמת פגיעת שני דברים יצא ראשונה הקל והיינו אש, וזה חלוק אש
 המלהם לעינינו, הנה לפי רבריך אחר הרעם אש, כי אחר המכה מן פגיעת
 הדברים יוצא האש, א"כ למה יראה האש בטרם ישמע המכה ? ואיך יהיה
 מוקדם ומאוחר מן פגיעת הדברים יצא האש, כי הקול לא ישמע רק אחר
 חילוק האויר :

ויען לו סכלות מעט לבך קאה, רבה צבאך וצאה, וכורת הדבר
 נכוחות, ממויסותיך תפיל שיחות : כי לא יתכן לפי התולדה לשמוע עלילה
 וסיבת הדבר, לא לבעבור מקרה ופגע וכח ההדיפה, רק לבעבור תולדות
 הראייה ושמיעה אלוצה, ולהוציאך מכשול, הנה אני לך במשל אמשל : כי
 כן יאה לכל קשה להבין לדבר אלוי במשל : הנה אתה עומד על הר
 גבוה ותלול, ובתחתית ההר איש אחר חוטב עצים או חוצב אבנים, ותראה
 כרגע נפית ידו לכרות ולא המכה רק אחר עבור הרגע, כן הדבר הזה :
 הנה עננים עבים רצים ביננו ובין מקום פגיעת העננים אשר יגולו לנו
 (העננים) לשמע מיד, רק לא יוכלו לסתום להם האש הסבריק לעין : על כן
 לפי התולדה ועכו (זה כן L ?), כי גדולה הרגשת העין מהרגשת האוזן, כי
 רגע הראות הברק לעין הוא רגע הרעם, רק העין ראתה מרחוק, והאויר
 סביא הקול אל האוזן והליכתו לאש, ולא יגיע אל האוזן רק אחר עבור הרגע :

סב.

למה הלבנה תחסר ממשלתה ?

אם בעיניך אני כבער, ושגנות כי שערו שער, לא אחד יש בהם ואין
 פקה, ואת ערובתם תקח : ואם מעט אשאל הבלים, עניך תעצם וכלי
 יוצר תנפצם : הנה דברנו על הארץ מתחת ועל תולדותיה, אחרי כן עלינו
 במעלות לדבר על האויר הממוצע ביננו ובין הרקיע ותולדותיו, ועתה אשוב
 אחליט לעלות עד הרקיע, כי דבר אשר הוא קשה לבי יפתה אותו לרוץ
 אחריך ולשמוע אמריך, וזה יצא ראשונה : למה הלבנה תחסר ממשלתה
 ולמאור יופיה יותר מחבורת הככבים והשמש ? למה לא תהיה שוה
 בממשלתה ? על זאת אשים מגמותי נוכחך, ועל פניך אוכיחך, כי העולם
 או הוא נעשה מתיכו, או נעשה מדבר ההווה : ואם הלבנה שהיא אחת מן
 הבריות גדולות תחילת קטעה (קיומה ?) ע"י שום דבר, למה תחסר עיגולה
 וסילוואה, וגם היא קרובה אלינו מן השמש ומן הככבים שלא יחסרו משה שהיו ?
 ויען דודי, עתה עברת מגדלים והצריח, והסעת דלתי התבונה והברית,
 מרוב אונים ועוצמה, על כן תצא ביד רמה, אך לי קרנים אשר לא תוכל
 לשברם : והנה שני שאלותיך על אמרך, אם הלבנה נבראת ממנה או משום
 דבר, קבל לך משניהם מה שתרצה, אך שים לבך ובעיניך ראה, למה
 הלבנה נבראת, ואל תביט ממה תחילת ברייתה : הנה שמעתי מתנודד
 למה הלבנה כל ימי ממשלתה [לא] (?) נגמרת ? והגמר שאתה אומר שתאה
 עגולה ושלימה, ראה מה יהיה תמיד בעיגולה, אך צריך שיהיה להמאור
 מעצמה ולא מדבר אחר : ואינו כן, כי אין לה רק מן השמש ממעל לה,
 ובפגיע מביט השמש, ותכים אליך באלכסון, לפי הפגיע תחסר אורה לשליש
 או לרביע או למחצה, על כן תחסר : וגם אתה ידעת כי היובש והחום
 הגדול ישלוט בארץ כשיהיה השמש בסרטן, והשמש ממשלת' ש'ס'ה ימים
 ויותר, על כן החום שלו במקרה באורך הזמן, כי עיקר נבורתו לא (לא)
 תראה רק בסרטן, ואם גבורת הלבנה תהיה מעצמה לא נוכל לעמוד בעולם
 לפי ממשלתה המחדשת בכל חודש : על כן הבורא ית' וית' אשר בראה
 לא נתן בה כח ממנה, אך קבע לה זמן להתחדש בכל חודש, ולהוסיף
 ולגרוע לפי מבט השמש אשר מכחו לה, ואור השמש צורה (אורה ?)
 עומדת ולא תסור, ולא כן אור הלבנה כאשר היא במדרגה השפלה,
 וישתנה אורה כפי מרחקה מן השמש : ואור הלבנה היא במקרה רק בהכנס
 על הארץ בין הלבנה ובין השמש בראש המלי או זנבו, לא תראה השמש
 אם היה ביום, ואם בהיותו בלילה ולנוכח השמש היה אור הלבנה נעדרת :

סליק סליק סליק א'א'א'ס'ס'ס'.

ואלו השאלות אשר שאל חכם אל דודו שהיה חכם גדול, וכן אמי:

Bodl. 1; Munich. XI.

דודי ונר הדודי, ידעתי כי כך עיצה וחכמה להשכילני, דודי, מדוע
יצמחו העשבים שלא היו נודעים?

נכדתי, כי השם ית' עושה פלא אשר נור ופעל כאלה, כי כל אשר
יחפץ עשה, הוא אמר ונור תדשא הארץ דשא עשב מוריע זרע, ועל פי זה
הנזירה יצמחו העשבים בלא זריעה ובלא עזר אדם, מהם לטוב ומהם לרע
על השם אי' להוסיף.

ולמה לא באו התבואות והדברים אחרים שבני אדם חיים מהם בלא
עזר אדם?

נכדתי, דע כי עבור הנזיר' שגור וקלל על העבירה שחטא אדם הראשון
ואמר הש' ית' בויעת אפך תאכל לחם, וקוץ ודרדר יצמית לך, ע"כ לא
באו התבואות בלא טורח ובלא עזר אדם:

2; M. XIII.

דודי, למה נצמחו העשבים מן הארץ מד' יסודות, כי הם קרות ולחות
וחמות ויבשות, וכמו בני אדם שהם טאש וממים ומעפר וטרוח, כי אמר
החכמים והפילוסופי' כי הארץ והעפר קר ויבש, והאש חם ויבש, והמים
קרים ולחים, והאוויר חם ולח, העשבים שהם מד' יסודות, איך יוכלו לצמוח
מן האדמה קרה ויבישה?

נכדתי, גלוי וידוע לכל החכמים כי העשבים הבאים מן הר' יסודות
וכן הארץ כמו כן מד' יסודות, וכן האש כמו כן מד' יסודות, וכן המים
מד' יסודות, וכן הרוח מד' יסודות, רק לפי שהנביר הקור והיובש על העפר
ועל האדמה יותר מן הג' יסודות סחמת נכרא' האדמה קרה ויבשה, ולפי
התולדה מן הארץ שהיא חמה ביותר או קרה ביותר או לחה ביותר או
יבשה ביותר, כמו כן נצמחו העשבים מן האדמה כפי תולדה מן הארץ:
וכן ישרצו המים, כך מגדלת הרגלים, ולפי שהתולדה מן המים, ולפי שכל
אחד ואחד נכראו מד' יסודות, לא יוכל א' אחד מהם מן הר' תולדות לגדל
ולהצמיח שום דבר כמו אש ומים עפר ורוח, ועל כן יצמחו ויגדלו (מן)
מן הר' יסודות בכל מקום שהם ביותר, וכל אחד לפי תולדתו:

דודי, אתה אמרת לי כמו האדמה תוצי' העשבי' והנ' יסודות אחרי'
כמו אש ומים ורוח מה הם סגדילי' וצומחי':

נכדתי, עניתי לך על המים ישרצו נפש חיה היא הדגה המגדלת במים,

והרוח הוא האויר והעננים זאת מגדלי' שר' הנקרא' לילית, וזאת הלילית דרה במקום חרב כמו בתי' או ערי' חרבי', והאש מגדל עוף שנקר' סלמנדרא, וכן הסכימו חכמי הרופאים :

3 ; M. XIV.

דודי, למה העץ נרכב מעץ „אונמייה“ בלע' בעץ אחר כשיוצי' פרי יוצאי' פרו כמו העץ, ולא הפרי כמו השורק אשר נידולו מן הארץ ושרשיו ברוחב ובאורך, ואיך יבגור הפרי בתולדתו ליקח ממנו כוחו מן העץ הקמן ולא יוצי' מן השורש הנדול ?

נכדי, ידעת כי צמיחת האילן הוא השורש כאשר יכרת לא ינשא עוד להתגדל, והשורש אשר יוציא הלהלוחית לא יעכב רק מה שצריך, ויעזוב לשורק הסותר, כמו נפש כל חי המעכב מה שצריך לו, וממציא לשאר איברים מה שאין צריך לו, אך השורק הנרכב בו עץ יגדליו וינשא ויגדל ויוציץ ציץ ויוציא פרח ויגדל שקדים ויעשה פרי, בעבור כי הפרי קרוב לשורק ורחוק מן השורש יתייחס למכע הקרוב אליו ולימינו (ולמינו ז.). ירחק כחולדה אשר רחף ממנו :

זה על בהמות ועופות :

4 ; M. XV.

דודי, הביני למה יש בהמות מעלה גרה :

נכדי, דע כי מאדם ומבהמות נשתנו התולדות זה מזה, הן מקור הן סחום, ואתה דע כי סחום הקרב מוחן המאכל עד אשר דק, וזה דרך השוורים והכבשי' והעזים והצבי והאייל, ע"כ קראו אותם הרופאי' בהמות מעלת גרה קרות כמכע, והנזים קוראי' אות' „מרנקוליאה“ :

דודי, אם הבהמה מעלה גרה עבור הקרות, הסום והחמור שקראו אותם הרופאי' קרים „מרנקוליא“ למה אינ' מעלי' גרה ?

נכדי, כדברך כן הוא כי הם קרים, אבל במדריגה אחת הם חמים יותר מן הבהמות שהזכר' כאן, השוורים והכבשי' העזים והצבי והאייל, יעוד יש עדים אחרי' לכל בהמה שאין מעלה גרה כי יש להם שיניים למעלה ולמטה, ופחון הטב מאכלם :

דודי, אתה אמרת כי כל קר ויבש מעלה גרה, והאדם כשהוא מתולדה קור ויבש מדוע אינו מעלה גרה כמו הרופאי' שקראו אות' הרופאי' „מרנקוליאה“ :

נכדי, יש בן אדם שהם קרים ויבשים בתולדתם, ואפילו כשהם קרים ויבשים יותר הם חמים מן הבהמות שהזכר', ולפעמים תראה בני אדם כי מרוב קרות במנם לא יפתחו מאכלם, וישוב מאכלם אל פיהם ויקיאו אותו מאכל חוץ, ובעבור שיש לבני אדם דעת לתעב המאכל כעניניהם אשר כבר בלע יקיא אותו לחוץ :

5 ; M. XVI.

דודי, תודיע' למה כל מעלת ותולדת בהמה גרה כאשר ישכבו יכרעו מפאת ענבותיהם וכרנליהם אחורנית :

נכדי, כי כל בהמות יש להם (חלב) חלבם מפאת הלב ולמטה, כמו השור והאחרי' כי הם קרים ויבשים, וכברו הו' מכבירו לצד אחר, ומרוב כוברו ישכב בצד הכבד שהוא אחרי' :

דודי, אם ישכבו זאת הבהמות שהזכרנו בעבור הכובד מהחלבי' מצד אחור, למה לא יקומו מצד הפנים שהוא להבריך הקל, כי הם בהמות כמו שישכיבו כן יקומו ?

נכדי, דע כי כל בהמות שיש להם חלב היא המעלת גרה, וחלב הקר מכביר לו, ולפי שיש לו חלב יותר עב ומותניים חזקי' ובעבור קביעתו ישכב לצד אחור הכבד, ובטנו יחמם מקרתו שהיכבדו, ואו יקל אותו ויתחזק מרוב חמיות :

6 ; M. XVII.

דודי, למה מידותיה' משונות מן הבהמות ומן החיות, כי כל בהמה וחיה שותים ומשתנים, וכל עוף שיש להם כנף שותה ואינו משתין :

נכדי, דע כי כל בהמה וחיה מגדלי' מחלב, והחלב בא מרטיבת הצמחי' והליחלוחי' מן המאכלים, והחלב עושה אכילה למי הרגלים כמים הניגרים ארצה, ויוצי' הליחלוחי' דרך סקות השתן, ואחרי שעשה אכילה לא יסתם עוד הנקב, והעופות אין תחלת נידולם מחלב, ואין נידולם מדברים שיש להם לחלוחית, וזה מאבנים קטנות או מחבואות, וכבא האבן או התבואה בקרבו בתחילה סותם מקום השתן, והליחלוחי' שבתוכ' לא יגיע אל מקום הנסתם, מן הליחלוחי' שבתוכם יגדל (יגדל יס) הנוצה ויצא הליחלוחי' בגודל הנוצה, ותרע ותבין אם תסתם אחר מנוצתם תמצא ליחלוחי' בנקב מן הנוצה שבתוכה יגדל הנוצה, ויצא הליחלוחית בגודל הנוצה :

נכדי, דע כי הבורא נתן יתירא (יתרה ל.) לאיש אשר נטע בלבו שכל הערמה
 יתחבולות וכליות יועצות לתפוס כל אילו הבהמות בתחבולותיו, ולבקש
 כלי זיין במלחמה ולבקש שלום לשונאיו ולהתבש' יחד ולהסתק סוד,
 ולבהמה שאין מענה בפיו צריך כלי בריחה וכלי זיין: ואם היו לאדם כלי
 זיין נמועי' בנופם יקצו בחייהם, בראות כי אין צורך אליהם בעת שלום,
 ואם יהיו בני אדם קלות כאיילים יהיה האדם סובר בלבו ויחשוב להיות
 אדם פרא, ולא ישום אל ליבו להיות חכם ולהבין חכמי' ולהבי'
 בוראו, ויהיו שוקיו ורגליו ואיבריו כידוקרים (sic) סמרוצתם, ובכא עליו
 שודד פתאום ומלחמה, לא יוכל לעמד ולקום ולשאת כלי למלחמה בעת
 הצורך: ע"כ ברא הקב"ה את האדם במתכונ' זה להיות שליו ושקט בעת
 שיהיה שלום, ולהתאמץ בעת שיהיה במלחמה:

11; M. XXI—XXII.

דודי, עתה נעלם ממני למה אדם ערום שוכח ואדם שומה נזכר (sic):
 נכדי, דע כי הלב מקבל כל כח המחשבה והנשמה יותר מכל איברי
 הגוף, ע"כ כל האיברים משרתי' לו, ויש מקומות בגוף שיש חבלים היוצאים
 מן המוח אל העיניים ואל האזנים וכולם משרתים למוח וללב, וע"ז אחד
 מן המוח והשני מן הלב והשלישי משאר האיברים, כי כמוח ד' גנוים,
 הראשון על המצח הוא גנו הפרצופי', ואחריו גנו החשש, ואחריו גנו
 הויכרון, ואחריו גנו שמוש (sic), כמו מעיין המוח להשקות כל הגוף ע"י חום
 השרדה היוצא ממנו כמו נהר היוצא ממעיין, וכל הגנוים יש בהם מוח
 כמו תולדתו, ויש במצח שני נקבי', וכשני הנקבי' אשר במצח שם יתגבר
 כח ההרגשה ומשם תחל המחשבה: והנה אבאר לך הבינה בא מן הפורמה:
 כאשר יראה האדם או האשה או סוס או בהמה או דבר אחר כל זאת
 דברים ע"י גנו הפרצופים הוא מבין אם הוא איש או בהמה או דבר אחר
 ומה שמו: ואם ילקה גנו הפרצופי' ע"י הכאה או פצע או דבר אחר או
 יבין ולא יכיר שום דבר: והערמה הזאת באה מן ליחלוח המוח שבאותו
 גנו, וכל מה שהיבין ושהיכיר ישמוט לברר ע"י הראייה, ויבחן כל מה
 שהיבין, וישם גנו החשש למשפט ולהרגשה ולהתענג גופו: ואם ילקה גנו
 החשש לא יהיה החולה חושש ומרגי' משום דבר ונרמית כבהמה, וכל מה
 ששפט גנו החשש ישם לדיכורו ע"י גנו הויכרון, כי שם הויכרון וחיותם כל
 מה שראה (שראו ל.) עיניו וכל מה ששמעו אוזניו, והבין להכיר ושפט

7; M. XVII.

דודי, למה יש עופות שיש בהם איסטומכות "נאויש" בלע' ולאחר'
 יש להם קורקבן "גווייר" בלע':
 נכדי, דע כי כל עופות שנידולם מן הארץ אין להם איסטומכ', כי לא
 יועיל להם, אכן יש להם קורקבן שהוא חזק וקשה יותר מן האיסטומכ' (sic),
 כי הקורקבן הוא עשוי למחון ולהדק כל דבר קשה, כי הוא מלא
 גידים מכחוז ומכפנים ובשר בין הגידים שבפנים והגירי' בחוז, והוא חזק
 ביותר על כן ימחן כל דבר הנכנס בו, והאיסטומכ' אין בו חוזק. כ"כ רק
 למחון מאכל דק:

8; M. XVIII.

דודי, למה יש בהמות ועופות שרואי' כלילה ואחר' אינ' רואים?
 נכדי, אתה ידעת כי ד' עורות יש בעין ובהן נמצא ג' ענייני' ליחה
 אשר מהם תצא הראייה והם נקראים דוקי', הראשון לבניה, ממנה מפרדת
 הראייה ובלה הראייה, השנית שעליה מקפצת הראייה שלא תפרד כי אין
 לבנה בראשונה: ה"סר לפני:

9; M. XVIII.

דודי, מאין יבא שישנ' הלבן מן העין וישנה ל"נאנא", שאם ישנה
 לאודם אין לתמוה, לפי כשהגביר הדם ילך בעין?
 נכדי, דע כי הכבד מעיין ומקור של הדם, ומרה האדומה הרבוקה
 בו שואבת הליחה ופסולה מדם הכבד, ואם תתמלא המרה לרוב או
 תשתפך לתוך הכבד ומשם יתערבו ויתפרד ויתפשט בכל הגוף ובעין מי
 המרה, ואז יראה לובן העין "נאנא" בלע', לפי שיחולו האיברים
 בשינוי דמם, ע"כ אמ' שלמה ע"ה הנך יפה עיניך יונים, כי במראה
 העין תראה בריאות הגוף:

10; M. XX.

דודי, פליאה נשגבה לי למה יתרון הבהמה על האדם, כי לבהמות
 יש כלי זיין נמועי' בנופ' מה שאין כן לבני אדם, או כלי לברות, כי לשור
 יש קרניים הוא כלי זיין, ולחזירי' יש שיניים הוא כלי זיין, ולארי יש לו
 פרסותי' להלחם וכן לכמה בהמות, ולבהמות אחרות יש להם כלי אחר
 לזיין, כי יש להם רגלים קלים לברוח מפני רודפיהם כגון איילים ושפנים
 זאנבת ואחר' הרבה, ולא כן לאדם:

ע"י הגנבים אחרי, ואותו מוח יבש יותר מן האחרים: וכל מי שיש לו מוח יבש יעמוד בו הזיכרון אבל לא יעמד בו הערמה, כי הערמה באה מלהלית המוח:

12; M. XXIII.

דודי, למה החוטם על הפה, כי זה דבר נתעב הוא אשר ירד ליחת מן האדם על פיו?

נכדי, כי בעבור שיש חום במוח הראש ויורד מן המוח ליחת, הושם החוטם קרוב למוח להוריד הליחה מימין ומשמאל ע"י שני נקבים שבו, מן ירד לפה מיאום היורד מן המוח שבראש, ובנלל כי הפה עבר לגוף ואין נקב מהגוף אל הפה, הושם הפה קרוב לגוף והבטן, להוריד ולהקיא ליחת הבטן:

13; M. XXIV.

דודי, למה ימרט שער הראש מהאדם מלפניו ולא ימרט מאחוריו הראש: נכדי, דע כי לא יכנס דבר בגוף בכמן רק דרך הפה, והמאכל בכמן ימחן ויתכשל בסיר אשר על האש, ואו יעלה העשן למעלה בראש דרך הנקבי, וזו הדרך קרוב לצד פני האדם ורחוק מצד האחור מהראש: ודע כי מקו' הכמן אשר ירתח בסיר ויתפשטו הנקבי וירחיבו ויצא דרך שם ההבל עם הליחלוחי' ולא תוכל השיער לעמד בעבור העשן העולה ברוחב הנקבי, ועל זה הדרך יקרה כבחורים אשר הם חמים ביותר להיות קרחים, כי לא יוכל השיער לעמד במ מפני העשן והחום העולה בראש ברוחב הנקבי:

14; M. XXV.

דודי, מה הקול היוצא ע"י בני האדם?
נכדי, דע כי קול היוצא והגשמה הוא האויר כאשר תראה כל מיני זמר, ודע כי האויר הנמצא בפה האדם ונרחה חוץ לפה מן הלשון ומן הגרון זה האויר יוצא:

15; M. XXVI.

דודי, מדוע קיר מברזל או מנחושת או קיר מאבן לא יוכל לראות, כי גדול גבורת העין מגבורת האויר כי אדם רואה למרחוק מה שלא יוכל לשמוע?

נכדי, דע כי הקול שהוא האויר יעבור דרך הנקבי' שאינם נראים: דודי, ומדוע לא ישלום העין לראות כאילו הנקבים כאשר תשלום האויר לשמוע:

נכדי, דע כי אופל והושך אויבים לעין ועין ישלום לראות החומה, כי האור והשמש תורח עליו ולא כן בתוך החומה ולא יוכל העין לראות:

16; M. XXVII.

דודי, תשכילני מהמראות העין ומדוע העין רואה:
נכדי, דע כי במוח יש אויר וך מאך שנגזר מתולדה האש ויורד על שני גידים היוצאי' מן המוח עד נקבי העין הנקראי' גוף ולא מצא צאתו בכל המצח וסביביו לפי שהכל קשה רק באילו כ' הנקבי' שהם דקי' מאד ומהם בא המראה וגם נקרא גוף, אמנם העין מד' יסודות אבל האש יותר בו מן הנ' יסודות אחרי, ולמה שניסגר העין לא תלך הראייה מכל וכל, ואתה ידעת כי כל דבר שינח מקבל גבורה בנוחו והאויר היוצא ממנו הראייה ינוח ויתגבר בתולדתו משיתפרד מראיתו אנה ואנ' בפתיחת העין:

17; M. XXXI.

דודי, למה רואה אדם פרצופו בכלי זכוכי'?
נכדי, דע כי אויבי' לעין חושך ואופל ע"כ המראה הזכה מצד העין והמאפלת מצד האחר, ומראה העין שלמה עד האופל ולא יותר וחזרה הראייה אל העין והגיד ראייתו, אבל הזכוכי' אשר וך משני עבריו תחזור (תתדור ל) הראייה ולא תחזור אל העין:

18; M. XXXII.

דודי, למה אדם עומד באור ואינו נראה במוב לאות' העומדי' בחושך, והעומדי' בחושך רואי' כמו' אות' העומדי' באור?
נכדי, הלא ידעתה כי האור והחושך אויבי' הם, וכשהעין יביט אל החושך לא ימצאו מעמד ויתעו מדרבם, אך כאשר יביטו אל האור אשר תולדתו ממנו, לפי שהראייה מן הנשמה שבמוח שהוא אור החיים, ויתענגו בתולדתו, וכן כשיביטו אל הזכוכי' שהם מתולדת' יתענגו כמו כן כי כן תולדתם:

19; M. XXXIII.

דודי, למה העינים בפנים ולמה אינ' באחורי הראש?
נכדי, אתה ידעת כי יש ג' חלקי' בסוּח, וכל מה שהעין רואה מגיד
לנשמה שבסוּח ע"י גידיים, והגנו הראשון הבינה והיא מה שהעין רואה,
והגנו האחר ישי' אותו למשפט ההרנשה, והגנו האחר ישים הכל בויכרון
ובחות', ואם יהיו העינים באחורי הראש תצא הזיכרון:

20; M. XXXIV.

דודי, למה האף מריח, והחיד יטעם, והיד מטששת, ואין אחר מהם
יוכל לעשות מלאכ' לחבירו?
נכדי, כי נגזרו כל אחד לעשות מלאכתם, האף לא יריח אם לא ימצא
ריח בחוץ או מר או מתוק או בושם או תפוח או דבר מינוף, לפי שהריח
צא (יוצא ל.) מן האויר הנמצא בחוץ ואותו האויר יגיע אל אפיו ויריח, והאף
והחומם נעשה על מתכונת הריח, כי החומם ארוך ומסילתו עד המוח שהנשמה
שוכבת בו, וכלי קשה מבשיר אחד ורך מעצם אחד הרוח, וכן מדברי'
הבאי' מן המוח אל החך ואל הלשון, וכן אל היד הנקרא' כלי המישוש, כי
היד תבחין בין קר ולח וחס ויבש, והחיד והלשון יטעמו ע"י גידי המוח
אשר שם הנשמה:

21; M. XXXV.

דודי, אם תשם לב האדם למה יולו עיניו כאשר יש לו שסחה,
ומאין בא לו הבכי?
נכדי, דע כי השמחה ירחיב לב האדם והוליד ותצמיח ותגדיל ברנע
קמן חום, ואותו חום משונה ויעל עשנו ולחותו לפי שעה אל המוח, ובלחותו
יולו מן המוח אל הנקבי' מן הראש, ועל אותו דרך ירדו בעיניו מים ויולו
עיניו דמעות:

22; M. XXXVI.

דודי, למה יצא טפה מן האדם רוח חם וקר?
נכדי, דע כי הרוח מן האויר נכנס ויוצא בנוף סביב הלב, ומן הלב
הולך לרפקי' שדופקי' בגלי (כגלי ל.) הים, והנשמה (ג) דחה החום ומשכת
האויר הקר ממנו, וע"כ דופקי' הרפק, ונמצא כי הרוח הנכנס בנוף כבר (כבר ל.)

ויוצא מיד מן הגוף ע"י הפה הוא חם מאד, ואותו הרוח המושך האדם מן
האויר אל הפה וינפח אותו קודם שיכנס אל הגוף הו' הקר, כמו שתרא'
בכלי ששמו שופליו"מ שנופחי' בו האש:

23; M. XXXVIII.

דודי, איך יוכל הגוף לסבול אוכל חם יותר מן הפה?
נכדי, אתה ידעתה כי כל האיברי' הקרובי' ללב הם יותר חמים מן
הרחוקים, והנה הגרון קרוב ללב יותר מן הפה ע"כ הם חמים לפי הסדרנות,
והפה והלשון קרים לפי שהם רחוקי' מן הלב, וכשהפה והלשון יטעם
המאכל החם יותר מראי לא יוכל לסבול, ובכאן דרך הגרון שהו' חם או
הוא סובל, וחוכל לראות אם ידך חמה לא תוכל ליגע אף דברי' קרים, ואם
ידך קרה והיגע לחם יותר מדי לא תוכל לסבול:

24; M. XL.

דודי, למה לא ילך הנער מיד כשנולד על רגליו, כמו הבהמה והחי'
שהולכי' על רגליהם מיד כשנולדי'
נכדי, ראה האדם איברי רכים יותר מכל בהמה וחייה, ונבר' על
מתכונת שילך בקומה וקופה להביט אל השמים, כי מרוח הכורא נברא,
והנשמה חפיצה להבין בוראה, ונפש הבהמה יורדת למטה לארץ, וברא
הכורא איברי' נסי' לכל אחד לפי משאו ולפי שבראו לעבוד האדם ולשרתו
נברא אליהם איברי' נסי' וקשי':

25; M. XLI.

דודי, למה יגדל הנער מחלב אמו תחילה, כי מעשה מינוף הוא?
נכדי, ידעת' כי תולדת האשם (האדם ל.) מרם האשה, ואחרי אשר
יצא לאויר נהפך הדם מן האשה לחלב, ע"כ יגדל מחלב אמו שהוא מתולדתו,
וכן בהמות וחיו' מניקות גוריהן: ומדוע אינו טוב לבחורי' ולוקני' כי הוא
תחילת גידול האדם עבור מהירות העיכל, בעבור כי דבר אחד צריך
לילדים רכים, ודבר אחר לבחורי' שאיברהיה' נגמרי', ולוקני' צריך להם
גידול חזק מכח האכילה כדי שיוכלו למרוח:

26; M. XLII.

דודי, למה יהיה אדם כריא מנוגע בשכבו עם אשה אחר ששכב עמה המנוגע, ולאותה אשה ששכב עמה המנוגע לא תהי' מנוגע'?

נכדי, דע כי תולדתו חס ויבש ותולדת מן האשה קרה ולחה, ע"כ כאשר תקבל האשה שהי' קרה ולחה זרע המנוגע שהו' חס ויבש, קרות ולחות של האשה ירחו את נגעו מבלתי תת דרך לאותו הזרע לשחת, כי כל דבר קר ולח לא יוכל למשוך אליו חום ויובש: אמנם הזרע שבה נזרע לא יאבד תולדתו וכח שלו, ובעת שיקום עליה איש כריא, מן היובש והחום שבו ומתולדת המנוגע שהוא חס ויבש הדומה לתולדתו יקרה שמוצי' אליו הנגע, כי חום ויובש מושך אליו חום ויובש כי הוא מסבעו, והקר ולח דוחה אותו כי איננו מסבעו:

27; M. XLIII.

דודי, למה הנשים מתאו' לזכר (כי) אף כי קרו' הם, כי האנשי' מתאו' מרוב חמימותם:

נכדי, בעבור קרתה היא מתאוה לחמם, והאיש מתאוה להפך לקרר מרוב חמימות, והליחה שיש בנשים ודם הנידות אינו יוכל להתבשל בה מרוב קרת' כמו שמתבשל באנשי' שהם חמים, והדם מתאוה לצאת חוץ, וצריך הדם שיצא בעלילת שכבה זרע מן האיש, אעפ"י אשר יקרה לאיש הנגע בעלילת מן האשה אשר שכב עמה המנוגע שכבת זרע האשה לא תמשוך אליה הנגע אם לא בנ' הנאים, כגון שמליד' בניס מן המנוגע, או המשוך אליה האויר היוצא מפי המנוגע, או כשהאשה חמה יותר מראי משכבת זרע:

28; M. XLIV.

דודי, למה יפרר האיש מחיותו וימות? לא שאלתו על ההרונים או מנועי' כי זה הכרח להם:

נכדי, הנשמה שבגוף נברא (sic) מהש' ע"כ תאוה קו המישור, זה גוף האדם הנברא מד' יסודות אש ומים, עפר ורוח, וכל זמן אשר הנשמה בגוף ותמצא הד' יסודות שוות זה כנגד זה, החום נגד הקור, והלח נגד היובש, מבלתי תהגבר זה על זה או קרוב זה לזה הד' תולדות, הנשמה תתענג ותשמח בה, ויהיה הגוף והנשמה כשני אוהבי' נאמני', וכשאחד מן היסודות מתגבר על השלשה או על השנים, והיו במחלוקת עד שיחסר אחד

מהם, לא יוכל הנשמה לעמוד בגוף אפילו שעה אחת: אם ישפיל אחד מהר' יסודו' עד שיחסר (ל), מיד יצא הנשמה מן הגוף כאיש אשר הוא בורח מפני שונאו:

29; M. XLV.

דודי, למה אדם שכב ואחר זמן מועט הוא רעב?

נכדי, האדם נברא מד' יסודות, והו' ממוסך הקור נגד החום, והלח נגד היובש, וכאשר הם ממוסכי' היטיב זה כנגד זה או האדם כריא, ויתבשל המאכל בנחת כדרכו ויתפרנס כל הגוף והאיברים, וכשיגבר החום שהוא אש מן הגוף על הג' יסודו' מיד המאכל נמחן ונעכל, ואחר זמן מועט מפני חום האש שבו הוא רעב, ואותו המאכל שהו' נמחן אינו מפרנס האיברים כדרכו וכעניינו הראשון, וזה יפול בחולי:

30; M. XLVI.

דודי, למה החי ירא מן המת אשר כנפשו אהבו, ומיד שהוא מת אהבתו אבדה כבר?

נכדי, דע כי החי אוהב כל דבר המעמיד את תולדתו, ולשנא מה שנהרס מסתכונתו והעמידה (והפרידה ל). שבעולם, כן הוא החיות נקראת חבורת גוף ונשמה, ע"כ צריך שכל חי יאהב חברת כו, ואחר שיאהב החבורה כן ישנה (ישנא ל). הפרידה, ואחרי אשר הפרידה הנשמה למה תשכ' הגוף (כגוף ל). כי שנאה הגוף מפרד, אך שומה שבשומי' לא יחשב לזו השנא' שום דבר:

31; M. I.

דודי, למה זה כאשר יפול איש במים יורד לטמא בקרקעי' המים, כשהוא מת הוא שומץ על פני המים, ואתה ידעת כי אדם מת כבר מן החי?

נכדי, דע כי נברא האיש מד' יסודות, אש, מים, עפר, רוח, ותולד, האש שהו' חס ויבש נסגר תוך סרה האדומה, ותולדתו לעלות למעלה, וכשפיתח המרה ימות, ויצא ממנו תולדה האויר ותולדה האש (רוי) בגוף, תולד' העפר ותולד' המים שיורדו' לטמא, ועל זה המת כבר יותר מן החי: ולפי דעתו, יען כי הגוף חלול הוא צף על פני המים:

32; M. V.

דודי, למה מי הים מלוחים יותר ממים אחרי? נכדי, כי הים גדולה ורחבה, ומקבל כח אור השמש והמשרתי וכל צבא השמים, ובעבור רחבה הו' מקבלת כל החמימות מן השמש הוורת עליה, ובחום השמש יהפכו המים להיות עבים ויהפכו למעם ממלח: ואם תשאל לעמים הקרובי לים, יאמרו לך כי בלא עשוי אדם מצאו מן המים שהם נשארים על סלעי שנהפכו למלח, בעבור כי המקום נגד זריחת השמש: ואם תשאל לרחוקי מן המקום שלא כנגד חום צבא השמים, כי לא יעשה להם מלח כוונת כהכרח אש ומדורה גדולה, גם הרא' כי ממים מתוקים יעשו מלח ע"י חום האש:

33; M. VII.

דודי, למה כל הנחלים הולכי אל הים, והים איננו מלא, כי אין לדעת קץ מספר הנחלים? נכדי, יש לדע' אשר כמו שקצת הנחלי הולכי אל הים כמו כן י"ל שקצת מהם יולדו מן הים, כי כבולעו כך פולטו, כי המים נגרו' מתחת לארץ ונבלעי' בה, וזה תולדת הים להשיב מה שבתוכו, וזה החיות מן הים:

34; M. VIII.

דודי, אתה אמרת' כי הנחלי ישובו מן הים, וממנו לא ניכר בהם מעם המלח אשר מצאו בהם בהתערבם יחד, כי מתוקי' הלכו בים ומתוקי' חזרו:

נכדי, אל התמה כי המים נגרו' במעובי האדמה ובחיק הארץ אשר לא מלוחה, ומה אשר קיבלו מן המים יפול מהם, אשר ילכו בכבדות, והמלח והעובי (*sic*) יצללו ויעכו ויצרפו להיות לקדמות' ולמתקות', ואם יעברו בתוך ארץ מלוחה או עכורה ישארו כן, ותדע כי אליכסנדרא אשר עבר הים הגדול, אריסטון רבו ציוה לו לישא עמו חול מארץ לא מלוחה, ושם תל גדול בספינה, ועשה כמו באר בחול, והיה בעת שיחסרו משקיו ולא יוכלו לשתות ממי הים, כי מלוחי' הם, ויקחו ממי הים וישליכו' באותו באר בחול, וישובו מתוקי':

35; M. —

דודי, למה נראה בשתן חולי הראש וחולי הגוף יותר מן הרע, כי את' ידעת כי המאכל והמשתה נכנסים בנוף דרך הוושם? נכדי, אתה יודע כי הריעי הו' פסולת מן המאכל שנכנס בכני המעיים, והשאר נתחלף לדם, ואותם הדם מפרנס כל האיברי' כל אחד ואחד לפי גדלו, והלב והמוח והכבד והמרה אדומה והמחול והכליו' והנידי' והחלבי' ע"י גידים קטנים, וכל המים שנפרדו מן הדמים אחרי' שלקחו האיברי' פרנסת' ירדו אל השלפוחי' ונכנסו בה והי' שומרת אות' המים ונהפכו לשחן:

36; M. —

דודי, למה הוורד הרופק (הרופן MS.) דופק משאר וורידים (וורידים), שלא ידפקו ויבינו ע"י הדפק אם הוא חם או קר ולח או יבש? נכדי, דע כשברא הקב"ה אדם, ויפח באפיו נשמת רוח חיים, ואותו רוח חם ולח, והוא סביב ללב ומעמיד ומקיים הלב והולך בכל הוורידים הרופקי', וכמו שנכנס בוורידי' כן יוצא אל הלב, ומשם יצא הרוח דרך הפה וזה הנשימה, ולפי שהוא חם ביותר צריך לצאת חוץ, ולהביא רוח אחר קר ממנו, והוא כנלי הים נכנס ויוצא: ובאות' הוורידי' הרופקי' אין בהם דם כמו בווריד' אחרים, אך יש להם וורד מלא רוח החיים סביב הלב, וידעו הרופאי' כשמשמש' בדפק הכח והגבורה מן הלב, ואם יש לו חום או קור או לחות או יובש: ותאות מן הנשים בא (*sic*) מן הלב, ומיד ישלח הלב דרך אותו וורד (*sic*) מן אותו רוח אל האבר הוא הניד:

סליק: