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## THUCYDIDES' DESCRIPTION OF THE GREAT PLAGUE AT ATHENS

THE nature of the Plague described by Thucydides in Book 2, chapter 49, has long been discussed both by medical and by classical scholars.<sup>1</sup> Of numerous suggested identifications none has found general approval; and it is doubtful whether any opinion is more prevalent today than that the problem is insoluble. The classical scholar is handicapped by his ignorance of medical science; his medical colleague has often been led astray by translations deficient in exactitude if not disfigured by error. The difficulties are great enough: but there is one indispensable preliminary task which can be undertaken with some prospect of success. If Thucydides' description is to be compared with modern records, it is necessary first to determine what the Greek words mean; and that can only be done by determining how far the Greek is expressed in the technical terms of contemporary medical science. It is obvious that Thucydides required a special vocabulary for this part of his work; and in fact over forty words in chapters 49 and 50 are unexampled elsewhere in his *History*, and a dozen more are used in meanings unexampled elsewhere. It is certain that a number of medical treatises were in circulation in Thucydides' lifetime, and that a more or less standard vocabulary had been or was being established. Now if it can be shown that the great majority of the terms employed by Thucydides in ch. 49 recur, apparently with the same meanings, as standard terms in the contemporary doctors, our second task—the comparison of Thucydides' description with modern records—will become a more rational undertaking than it was before, no longer the doubtful speculation which many of the modern doctors suppose it to be, thinking as they do that they have to deal with a layman's generalities expressed in literary language.

I have not been able to discover that this foundation has yet been laid, though much valuable material was assembled by Ehlert on pp. 98–124 of the dissertation quoted in my first footnote. There a selection of the Thucydidean

<sup>1</sup> To compile even a select bibliography of writings on this topic for the last hundred years would take much more time and trouble than I am prepared to spend on it. The subject is beyond the scope of the standard bibliographical publications: it is hard to discover what has been written; and then it is often still harder to obtain the books. It was by mere chance that I found one of the two treatises which proved most useful—*Die Krankheit zu Athen nach Thucydides*, by Dr. H. Brandeis, Kais.-russ. Hofrath, a pamphlet published at Stuttgart in 1845; it is not mentioned by any other work which I have seen on this subject. Gleanings from the last forty years of Bursian are small and generally unfruitful. Schmid-Staehlin, i. v, p. 75, n. 3, refers to two useful works: B. von Hagen, 'Die sogenannte Pest des Thuk.', *Gymnasium*, xlix, 1938, pp. 120 ff. (I am obliged to the University Librarian

at Cambridge for providing me with microfilms of this elusive article); and J. Ehlert, *de verborum copia Thuc.*, diss. Berlin, 1910. Classen-Steup mention only the agnostic W. Ebstein, *Die Pest des Thuk.*, Stuttgart, 1899, and 'Nochmals die Pest des Thuk.', *Deutsche Mediz. Wochenschr.* xxxvi, 1899, pp. 594 ff. Valuable notes and comments, such as those of Finley, *Thucydides*, 1942, p. 158, n. 2, and Sir Clifford Allbutt, *Greek Medicine in Rome*, 1921, pp. 340 f., are to be found in numerous places, likely and unlikely. Useful introductions to the medical literature are provided most recently by J. F. D. Shrewsbury, *Bulletin of the History of Medicine*, xxiv, 1950, pp. 1 ff. (mostly British and American), and by B. von Hagen, *op. cit.* (mostly German). I have read a great deal: but I expect and hope that my attention will be drawn to serious omissions.

terms, especially of the verbs, is copiously illustrated from the Hippocratic Corpus; I was able to supplement my own collection from his, and his from mine.<sup>1</sup>

### PART I

Before we begin the task, it is proper to observe that the omens are favourable. It will be generally admitted that Thucydides is a keen observer, a clear thinker, and an accurate writer. He was himself afflicted by the Plague; and his purpose was to leave to posterity a description by which it could be recognized if it should ever recur. Further, it is highly probable that he was familiar with the writings of the contemporary Hippocratic school; and a good case has been stated for the conclusion that his conception of historical method and principles is closely related to the doctrines of that school.<sup>2</sup>

The general resemblance between Thucydides' description of the Plague and the plan of the *Epidemics* has often been noticed. Thucydides begins by describing (with the greatest brevity) what Hippocrates called the *κατάστασις*, the general conditions prevailing at the time of the outbreak. He then narrates the observed facts without comment, and without mention of such treatment as may have been applied; he names the days—the 7th and 9th—on which the 'crisis' was to be expected; and concludes with an account of the complications which ensued in cases where the patients survived the 'crisis'. The similarity of principles is still more patent than that of method. It was characteristic of the Hippocratic doctors that they exalted *prognosis* above diagnosis, above the study of causes, and above the classification of diseases. The physician's task, according to this school, was not to theorize about origins, or to differentiate diseases by classifying particular groups of symptoms; nor yet to provide specific remedies for symptoms in isolation. The object of accurate observation and recording was *prognosis*, the understanding in advance of the course which the symptoms would follow, the foreknowledge of the development of the disease from the beginning to the end. Only thus could the physician ascertain which maladies might be regarded as curable; when the 'crisis' of each might be expected; what relief could be given to the patient day by day—not with a view to obstructing the progress of the disease as a whole (that progress was usually regarded as irremediable) but in order to strengthen the patient's resistance to foreseen developments. Many readers have noticed the resemblance between Thucydides' statement of his aim and several passages in the Hippocratic treatises, particularly the beginning of *Prognosticon*:

'The first duty of the physician is to practise forecasting. If he foreknows and foretells at the sick-bed the present, the past, and the future, and describes in detail what the sick man has omitted from his own account, he will create confidence that he understands what is the matter with his patients, who will then take heart and entrust themselves to his care. Moreover, the value of his treatment depends on his ability to foretell the future from the present symptoms.'

In the same spirit Thucydides declares that his object is not to inquire into causes, but to provide the factual evidence necessary for *prognosis*, so that the

<sup>1</sup> W. Nestlé in *Hermes*, lxxiii, 1938, pp. 28 ff., gives some Hippocratic examples of a few Thucydidean terms; such *obiter dicta* on this difficult subject are misleading, and

Ehlert had already rendered them superfluous.

<sup>2</sup> C. N. Cochrane, *Thucydides and the Science of History*, 1929.

physician may in future know in advance the course which the Plague will follow from start to finish:

'Each individual, whether doctor or layman, is free to relate his personal opinion about the origin of the Plague, and the causes of this unprecedented disturbance, if he can find any powerful enough to account for it. *For my part, I shall describe it just as it was, and provide evidence in the light of which the student may have some knowledge in advance, and so have the best chance of recognizing it if it should ever recur.*'<sup>1</sup>

Finally, it might be presumed from the start that Thucydides was familiar with the doctors' terminology. When he says of the evacuations of bile that they were 'of every kind *for which the doctors have a name*', *πᾶσαι ὄσαι ὑπὸ ἰατρῶν ὀνομασμέναι εἰσίν*, it is to be presumed that he was familiar with those names, and that he was not ignorant of less recondite medical terms.<sup>2</sup>

But *prima facie* probabilities and presumptions are not enough. We need exact knowledge. The facts are easily ascertainable: and this will be the first part of our task—to determine how far Thucydides' description of the Plague is expressed in the standard terms of contemporary medical science.<sup>3</sup>

First, the Thucydidean terms for parts of the human body:<sup>4</sup> these are *αἰδοῖα*, *†ἀκρωτήρια*, *γλῶσσα*, *†τὰ ἐντός*,<sup>5</sup> *\*καρδία*, *κεφαλή*, *\*κοιλία*, *\*ὄφθαλμοί*,<sup>6</sup> *πόδες*, *\*στήθη*, *\*φάρυγξ*, *χεῖρες*, *\*χολή*.

<sup>1</sup> Thuc. 2. 48. 3. Cf. *Epid.*<sup>1</sup> 11 (i. 164 J., i. 189–90 K.) *λέγειν τὰ προγεγόμενα, γινώσκειν τὰ παρόντα, προλέγειν τὰ ἐσόμενα μελετᾶν ταῦτα.*

<sup>2</sup> I suppose that Thuc. refers especially to the numerous shades of colour named by the doctors in this connexion: cf. *Prog.* 13. 4 (ii. 28 J., i, p. 91 K.) *εἰ δὲ εἴη τὸ ἐμύμενον πρασοειδὲς ἢ πελιδνὸν ἢ μέλαν κτλ. . . . εἰ δὲ καὶ πάντα τὰ χρώματα ὁ αὐτὸς ἄνθρωπος ἐμέοι κτλ.*

<sup>3</sup> For the purpose of what follows, I have admitted evidence from schools other than the Hippocratic, but seldom unless there appeared to be no reason to doubt that the terminology in question was more or less uniform. I have further admitted the evidence of treatises written probably in the fourth century B.C., on the ground that a high proportion of the terms standard in that era were probably established in medical parlance long before. The dating of the treatises opens a wide field for research: differences and resemblances in thought and style between one work and another are often obvious to the most casual inspection; and very different levels of medical science are represented. Perusal of Gossen, *RE* viii. 1802 ff., and Edelstein, *RE* suppl. vi. 1290 ff., suggests that a great deal remains to be done. The confident dating of a large number of the treatises to the second half of the fifth century B.C. surprises me: but I see no reason to dispute it in some cases (esp. *Prog.*, *V.M.*, *Epid.*<sup>1,3</sup>, *Aēr.*, *Acut.*, and a few

others; of these I have made most use), or to doubt that the majority of the remainder were composed before the end of the fourth century.

<sup>4</sup> In the sequel, an asterisk signifies that the word occurs nowhere else in Thuc., a dagger that it does not recur with the same meaning. In quoting from the *Hippocratica*, I have thought to serve the reader's convenience by adopting the following tedious procedure: The excellent text of Dr. W. H. S. Jones in the Loeb Series is quoted first (by chapter and line, followed by number of volume and page+ 'J.') for all treatises included in it. If these treatises are found also in the Teubner text of H. Kuehlewein (vol. i, 1894; vol. ii, 1902) or in the *Corpus Medicorum Graecorum* (t. i, ed. I. L. Heiberg, 1927), references to these works (by volume and page+ 'K.' for Kuehlewein, by page+ 'H.' for Heiberg) are added to the Jones-references. (The only treatises in K. and H. which are not in Jones are *Liqu.* and *Medic.* 2–end, both in H. only.) Treatises which are not included in Jones's edition are quoted (by chapter, followed by volume and page+ 'L.') from the great work of Littré (Paris, 1839–61). Abbreviated treatise-titles conform throughout to the list in LSJ.

<sup>5</sup> *τὰ ἐντός* *Loc. Hom.* 45 (vi. 340 L.): *τὰ ἔνδον* is much commoner in the doctors.

<sup>6</sup> Thuc. uses *ὄμματα* in 2. 11. 7; *ὄφθ.* is much commoner than *ὄμμ.* throughout the doctors.

Most, but not quite all, of these terms are common in Attic prose: all without exception are common in the doctors. It is seldom possible to determine precisely the limits of their meanings; the most we can say is that the broad meanings which they bear in the medical treatises are without exception applicable to their interpretation in Thucydides. If we now inquire whether any of these terms indicates familiarity with medical parlance—terms common in the doctors but abnormal in other prose—the following come under consideration:

(i) **καρδία**. It is generally held that Thuc. uses *καρδία* here in an unusual sense. According to Galen (v. 275 Kühn, cf. Schol. Thuc. ad loc.), *καρδία* in this passage means 'the cardiac orifice of the stomach', τὸ στόμα τῆς γαστρός. This piece of erudition has long been enshrined in our translations, commentaries, and lexica: I am not particularly concerned to dispute it, but I offer two observations:

First, that there is no proof that *καρδία* here means anything but 'heart'. It is possible that the verb ἀνέστρεφε (of which more later) and the following mention of the vomiting of gall were thought by Galen to suggest that *καρδία* referred to the stomach: but there is no reason to suppose that Thucydides could not use the verb ἀναστρέφειν of a general disturbance of the heart, or that he could not write of a disturbance of the heart in one clause and of the vomiting of gall in the next. Secondly, that the normal meaning of *καρδίη* in the doctors is 'heart', not 'stomach'. In the treatise *περὶ καρδίης*, for example, the subject is the *heart*. I am not competent to decide whether there is good reason to believe that the doctors occasionally use the word in some sense other than 'heart'. It is certainly hard for the layman to understand why Littré's index quotes *Prorrh.* 1. 72 (v. 528 L.) and *Aff.* 14, 15 (vi. 222, 224 L.); or why Nestlé should add *Epid.*<sup>2</sup> 2. 1 (v. 84 L.), or the Loeb editor *Epid.*<sup>1</sup>, cases iv, v (i. 192 ff. J., i. 205 f. K.) and *Epid.*<sup>3</sup>, case xii (i. 236 J., i. 223 K.), as examples of *καρδίη* in the sense 'stomach'. In all these places the translation 'heart' appears to present no special difficulty.

For our purpose it is enough to know that the normal medical sense of this word, 'heart', is applicable to Thucydides; if a case can be made for a much rarer and more recondite medical meaning in Thucydides, so much the better; but I have not yet seen it made.

(ii) **ἄκρωτήρια**. This word, in the sense 'extremities of the body', is common in the doctors (e.g. *Acut.* 42. 7 (ii. 98 J., i. 130 K.), 59. 12 (ii. 114 J., i. 140 K.), *Aph.* 7. 1, 26 (iv. 192, 196 J.), *Flat.* 8. 11 (ii. 236 J., p. 95 H.), *Morb.*<sup>1</sup> 29 (vi. 198 L.), 33 (vi. 203 L.), 34 (vi. 204 L.)), apparently synonymous with the common ἄκρεια, ἄκρα. It is very rare in Attic prose; but, since it does occur (*Lysias* 5. 26), Thucydides' indebtedness to medical terminology cannot be proved.

The Thucydidean terms for affections of the body are a little more suggestive. The general terms νόσος and νόσημα are the commonest words for 'disease' in the doctors. νόσος is, as a rule, a more general term than νόσημα, which is most often used when a particular malady is under consideration. It is noticeable that the word \*νόσημα occurs in Thucydides only with reference to the Plague.

Of eighteen particular terms, fifteen occur in Thucydides nowhere else. With one exception, all these terms are normally used by the doctors to describe, so far as we can tell, the same things. For most of them there was probably no other term available; but the following may be thought to indicate familiarity with medical parlance:

(i) †**πόνος**, of physical pain: *κατέβαινε ἐς τὰ στήθη ὁ πόνος*. *πόνος* and *δδύνη* are the two standard general terms for the 'trouble' and 'pain' of disease (see Jones, i, *Intro.*, p. lx).

(ii) The plural **\*θέρμαι**, 'feverishness': *τῆς κεφαλῆς θέρμαι*. Common in medical writings, and almost wholly confined to them (*Salubr.* 5. 9 (iv. 50 J.), *Epid.*<sup>4</sup> 42 (v. 184 L.), *Epid.*<sup>5</sup> 55 (v. 238 L.), 59 (v. 240 L.)).<sup>1</sup>

(iii) **έρύθημα**, 'reddening' or 'redness': *τῶν ὀφθαλμῶν ἐρυθρήματα*. This word is not attested earlier than Thucydides; it is common in the doctors (*Prog.* 17. 7 (ii. 34 J., i. 96 K.), 23. 12, 17, 23, 24 (ii. 46 ff. J., i. 63 f. K.), and often).

(iv) **ἐλκωσις**, 'lesion', creation of sores, ulcers, and the like, as a rule on the soft parts of the body, whether internally or externally: *ἐλκώσεως τε αὐτῆι* (sc. *τῆι κοιλίαι*) *ἰσχυρᾶς ἐγγυρομένης*. This noun, apparently not found elsewhere in fifth-century Greek, is common in the doctors (especially in *Fract.*, but also, for example, *Aph.* 3. 21 (iv. 128 J.), 4. 75 (iv. 154 J.), 81 (iv. 156 J.), *Alim.* 16 (i. 346 J., p. 80 H.), *Int.* 16 (vii. 204 L.)).

The remainder call for brief comment. Most of them are so common in the doctors that quotation of examples is wholly superfluous:

**\*ἀγρυπνία** is the standard medical term for *sleeplessness*; **ἀπορία** for general *helplessness*, being at a loss; **\*βήξις** for *cough* (masculine in Thuc.: elsewhere always feminine so far as I know; see too the Dindorfs' *Lexicon* s.v.); **\*βράγχος** for *hoarseness*; **\*διάρροια** for *diarrhoea*; **δίψα** for *thirst* (elsewhere in Thuc., MSS. vary between *δίψα* and *δίψος*, 4. 35. 4, 7. 87. 2; *δίψα* is much the commoner in the doctors). **\*ἐλκος** is a term of general reference, most commonly signifying a lesion of the soft parts of the body (the context must decide whether 'sore', 'ulcer', 'wound', or what else is intended). **\*καῦμα**, of a *burning sensation*, is a standard term. **\*λήθη**, *loss of memory*, occurs seldom but seems to be the standard word where it is required (*Epid.*<sup>3</sup> *cat.* 3. 6. 10 (i. 244 J., i. 227 K.) *λήθη καὶ ἀφες καὶ ἀφωνίη*; case 13 (i. 278 J., i. 242 K.) *λήθη πάντων ὅ τι λέγοι*; *Epid.*<sup>7</sup> 3 (v. 370 L.) *λήθη δέ τις τοιαύτη κτλ.*; *Coac.* 1. 6 (v. 588 L.) *μετὰ ῥίγους ἄγνοια κακόν, κακόν δέ καὶ λήθη*). **\*λύξις** (*λυγώδης*) and *λυγμός* (*λυγμώδης*) are both common in the doctors: the translation *hiccoughs* is misleading unless it is enlarged to include *retching*, the motion without the product of vomiting (so also Brandeis, *op. cit.*, p. 21, n. 21). **†πνεῦμα** is the doctors' normal word for both *breath* and *breathing*: this may be the meaning in Thucydides, though I cannot disprove Brandeis's suggestion that the word here refers not to the breathing of the patient but to the exhalation given off by the infected tongue and throat.<sup>2</sup> **\*πταρμός**, *sneezing*, and **\*σπασμός**, *convulsion*, are standard medical terms. **\*φλύκταινα** (*φλυκτίς*, *φλυκταινίς*, -*ιδιον*) is the standard term for an exanthem of the blister-type (*V.M.* 16. 35 (i. 44 J., i. 19 K., p. 48 H.) *φλύκταιναι ἀνίστανται ὡσπερ τοῖς ἀπὸ πυρὸς κατακεκαυμένοις*, *Epid.*<sup>2</sup> 1 (v. 72 L.) *φλυκταινίδες ὡσπερ πυρίκαυτοι ἐπανάσταντο*). **\*φλόγωσις**, the only Thucydidean term which appears to be missing from the Hippocratic vocabulary, is usually rendered 'inflammation'. But the common Hippocratic term for 'inflammation'

<sup>1</sup> Dr. Jones, *Malaria*, pp. 21 ff., points out that Thuc. does not use the common word for a fever, *πυρετός*: there is great probability in his inference that since 'in popular speech . . . there is a tendency to limit *πυρετοί* to definite fevers, namely, to those exhibiting a certain periodicity', Thuc. deliberately excludes this term from his

description of a wholly unfamiliar disease.

<sup>2</sup> Brandeis aptly compares Dion. Hal. *arch.* 10. 53 (on the plague at Rome, written with many conscious imitations of Thuc.) *ἐκκυμαιομένων γὰρ τῶν σωματῶν βαρεῖα καὶ δυσώδης προσπίπτουσα καὶ τοῖς ἐπι ἐρρωμένοις ἢ τοῦ πνεύματος ἀποφορὰ ταχείας ἔφερε τοῖς σώμασι τὰς τροπὰς*.

is φλεγμονή; it may be that instead of speaking generally of 'inflammation' here, Thucydides has referred specifically to two factors which together constitute the inflammation—έρύθημα, the redness, and φλόγωσις, the burning<sup>1</sup> (much the same thing as φλογμός in *V.M.* 19. 6 (i. 48 J., i. 22 K., p. 49 H.)). It is, however, to be noticed that φλόγωσις is a common equivalent to φλεγμονή in Galen and later doctors.

I add to this list of symptoms and affections the sentence in which Thucydides says that the patients 'could not endure the laying-on of even the lightest wraps and linens', μήτε τῶν πάνυ λεπτῶν ἱματίων καὶ κυδόνων τὰς ἐπιβολὰς . . . ἀνέχεσθαι: the phraseology is similar to that of the doctors (*morb.*<sup>3</sup> 13 (vii. 134 L.) ἱμάτια λεπτὰ ἐπιβάλλειν, *Fract.* 10. 7 (iii. 120 J., ii. 62 K.) περιβολὰς ὀθονίων), and the fact is often recorded in them (*Int.* 36 (vii. 356 L.) τὸ ἱμάτιον πρὸς τῷ σώματι προσκείμενον οὐκ ἀνέχεται, *Epid.*<sup>7</sup> 11 (v. 382 L.) τὸ ἱμάτιον ἔστιν ὅτε ἀπερρίπτει, 84 (v. 442 L.) τὸ ἱμάτιον αἰεὶ ἀπὸ τῶν στηθῶν ἀπεώθει, *Acut.* 42. 12 (ii. 98 J., i. 130 K.) ἱματίων ἀπορρίψεις ἀπὸ τοῦ στηθεος).

Thucydides reveals his familiarity with medical parlance more in his choice of adjectives than in his terms for parts and affections of the body. The following six are specially noticeable:

(i) ἰσχυρός. The doctors notoriously overwork this adjective to describe a *severe, violent* pain, fever, headache, insomnia, and the like. There are few, if any, commoner epithets in the Hippocratic Corpus. Thucydides employs it four times in a small space—θέρμαι ἰσχυραί, βηχὸς ἰσχυροῦ, σπασμὸν ἰσχυρόν, ἐλκώσεως ἰσχυρᾶς. The doctors provide abundant examples of similar excess, e.g. *Aër.* 4. 25 (i. 78 J., i. 37 K., p. 58 H.) ὀφθαλμίας ἰσχυρᾶς, αἰμορροίας ἰσχυρᾶς, νοσεύματα ἰσχυρά, within a few lines.

(ii) \*ἄκρατος: διαρροίας ἄμα ἀκράτου ἐπιπιπτούσης. This word makes an important contribution to our inquiry into the nature of the Plague. It is a standard technical epithet for διάρροια in the doctors, meaning 'marked by absence of κρᾶσις', 'uncompounded', 'uniformly fluid'.<sup>2</sup> It is never, so far as I can find out, applied to the stools of *dysentery*. If the noun and adjective in Thucydides are to be understood in their medical senses, we shall draw the very important inference that *dysentery* is not mentioned in *Thucydides' description of the Plague*; and we shall therefore be unable to acquiesce in the identification of the Plague with any disease of which dysentery<sup>3</sup> is a signal characteristic.

The distinction between διάρροια and δυσεντερή is clearly defined and studiously observed by the doctors. In *Vict.*<sup>3</sup> 74. (iv. 394 ff. J.) διάρροια is said to be the name given to the disorder so long as only the waste products of food pass, 'but when the bowel is scraped and ulcerated, and blood passes, it is called *dysentery*, a difficult and dangerous ailment'; cf. especially *Aff.* 23 and 24 (vi. 234 seqq. L.), *Aph.* 7. 23 and 76 (iv. 196, 214 J.). The term δυσεντερή in the doctors normally refers to dysenteric stools, which may be ὕφαιμα, χολώδεα, μξώδεα, πνώδεα, φλεγματώδεα—anything but the waste products of food;

<sup>1</sup> So Brandeis, op. cit.

<sup>2</sup> The truth is not to be found in either LSJ or the Dindorf's' Lexicon. Nor yet in Galen (xviii. 1. 122 Kühn), who defines ἄκρατοι (stools) thus: ἀμικτοι ὑγρότητος ἰδατώδους, αὐτὸν μόνον ἔχουσι εἰλικρινῆ κάτω ὑπερχόμενον χυμὸν, εἴτε τὸν τῆς ξανθῆς χολῆς, εἴτε τὸν τῆς μελαίνης: this definition is much

too narrow for many places in the *Hippocratica* (e.g. in *Epid.*<sup>1,3</sup>) where χολώδης is regularly added to ἀκρητος where appropriate.

<sup>3</sup> In what follows I have consistently used 'dysentery' in its Greek sense, referring to stools of blood, mucus, pus, and the like.

*Epid.*<sup>5</sup> 90 (v. 254 L.), *Epid.*<sup>7</sup> 3 (v. 368 L.), *Coac.* 453 (v. 686 L.), 455 (ibid.), *Aff.* 23 (vi. 234 L.). *δυσεντερική* is by nature always *ἄκρητος*: the adjective would be utterly superfluous, and is never applied to it (at least I have noticed no example, and have further checked the 56 references to *δυσεντερική* in Littré's index without finding one). *διάρροια*, on the contrary, may be of varying degrees of compoundedness, and the adjective *ἄκρητος* serves to signify that particular state which is one of uniform fluidity. Only a writer who was grossly ignorant of the simplest distinctions of contemporary medical science could use the term *διάρροια* to signify, or to include, dysentery; only one to whom the medical writings were closed books could then take the further step of attaching to *διάρροια* the epithet *ἄκρατος*, which is a standard term for diarrhoea and never applied to dysentery. The weight of evidence will indicate clearly enough that so ludicrous a blunder is not to be attributed to Thucydides.

(iii) \**αἱματώδης*: τὰ ἐντός, ἢ τε φάρνγξ καὶ ἢ γλώσσα, εὐθὺς αἱματώδη ἦν. This adjective, normally meaning not 'bloody' but 'blood-red' or more generally 'looking like blood', is very common in the doctors, elsewhere found only in Aristotle and his school (according to LSJ and the Dindorf's Lexicon). With Thucydides' phrase compare *Aph.* 7 append. (iv. 218 J.) *φοβερώτερον γὰρ ἔστιν ἢ γλώσσα . . . αἱματώδης*.

(iv) \**δυσώδης*: πνεῦμα ἄτοπον καὶ δυσῶδες ἤφει. Another very common adjective in the doctors, uncommon elsewhere (but Hdt. 2. 94, *S. Phil.* 1032). I have not noticed its application to the noun πνεῦμα, but cf. *Aff.* 20 (6. 228 L.) *δυσῶδες ἐκ τοῦ στόματος*.

(v) When Thucydides describes the body as οὔτε ἄγαν \**θερμόν* . . . οὔτε *χλωρόν*, ἀλλ' \**ὑπέρυθρον*, \**πελιδόν*, he uses three of the commonest colour-terms in the medical vocabulary. Examples of *ὑπέρυθρον* and *πελιδόν* may be counted by the scores, perhaps by the hundreds; both are very rare elsewhere. For the juxtaposition of *χλωρόν*, *ὑπέρυθρον*, *πελιδόν*, cf. *Morb.*<sup>2</sup> 46 (vii. 64 L.) *χλωρὰ . . . πελιδὰ . . . ὑπέρυθρον*, *Prog.* 24. 64 (ii. 52 J., i. 107 K.) *χλωρόν ἢ πελιδόν ἢ ἐρυθρόν*, *Art.* 86. 17 (iii. 394 J., ii. 243 K.). The meaning of *χλωρόν* is fairly obvious in *Morb.*<sup>2</sup> 39 (vii. 54 L.), 'yellowish', of the colour of the skin in jaundice.

(vi) \**ἐναταῖοι καὶ ἑβδομαῖοι*: this type of adjective, applied to the patient, with the meaning 'on the ninth or seventh day' of his illness, is exceedingly common in the doctors. Cf. *Prog.* 15. 33 (ii. 32 J., i. 94 K.) *ἀπόλοιτ' ἂν . . . ἐναταῖος ἢ ἐνδεκαταῖος*; see further Ehlert, op. cit., p. 106, n. 19.

The above-mentioned adjectives are specially at home in medical writings. Three others deserve a mention:

(i) \**ἄνοσον*. When Thucydides writes *ἔτος . . . ἄνοσον ἐς τὰς ἄλλας ἀθνεναίαις ἐτύγχανεν ὄν*, we are at once reminded of the doctors' manner of speech: *Epid.*<sup>1</sup> 14. 5 (i. 166 J., i. 191 K.) *τά τε ἄλλα διετέλεον ἄνοσοι*, *Epid.*<sup>1</sup> 1. 29 (i. 148 J., i. 181 K.) *τά δ' ἄλλα . . . ἀνόσως διήγον*.

(ii) *ἄτοπον*: πνεῦμα ἄτοπον καὶ δυσῶδες ἤφει. *ἄτοπος*, *ἀτοπία*, are apparently first attested in Thucydides and his contemporaries. They become relatively common only from the later years of the fifth century onwards. It is therefore worth noticing that they are not absent from the doctors' vocabulary: *Aph.* 4. 52 (iv. 148 J.) *ὀκόσοισιν . . . κατὰ προαίρεσιν οἱ ὀφθαλμοὶ δακρύουσιν, οὐδὲν ἄτοπον ὀκόσοι δὲ μὴ κατὰ προαίρεσιν, ἀτοπώτερον* This is the only example which I have noticed in the doctors. Ehlert omits this, and quotes *Int.* 21 (vii. 218 L.),



a false reference which I have not succeeded in correcting. There is a manifest imitation of Thuc. in Dion. Hal. *arch.* x. 53.

(iii) **κενή**: *λύγξ ἐνέπιπτε κενή*, an *empty, unproductive* retching. I have not noticed an exact parallel to this use of the adjective in the doctors, but *Epid.*<sup>7</sup> 11 (v. 386 L.) *ἐξαναστέειε . . . διὰ κενῆς* (of tenesmus) comes very close to it. The scholia on Thucydides refer to a passage in *Aph.*, which is obviously irrelevant (6. 39 (iv. 188 J.)) *σπασμοὶ γίνονται ὑπὸ πληρώσιος ἢ κενώσιος, οὕτω δὲ καὶ λυγμός*).

When we turn to Thucydides' verbs, we find that the majority of them are standard terms in the doctors. Many of them are common also in other kinds of writing. A few are almost if not wholly confined to medical treatises.

When Thucydides writes (in ch. 50) that there was no remedy *ὅ τι χρῆν προσφέροντας ὠφελεῖν*: *τὸ γὰρ τῶι ξυνευγκὸν ἄλλον τοῦτο ἔβλαπτεν*, he is using common verbs which any writer might have employed in those senses. But it is nevertheless proper to observe that what others *might* use, the doctors regularly *did* use, in a given context. *προσφέρειν* is the standard term for *administering* a diet or remedy; *ξυνευγκεῖν* is a standard term for *doing good* to the patient; *ὠφελεῖν* and *βλάπτειν* are the standard terms for *relieving* and *aggravating* the patient's condition.

Into this category fall most of the verbs used by Thucydides to signify the access, progress, and activity of the Plague and its symptoms, and the actions, reactions, and sufferings of the patients.

Of the access of disease or part thereof: the following are too common in the doctors to require particular illustration:

**λαμβάνειν** (and *ἐπιλαμβάνειν*, ch. 51. 6), *φλόγωσις ἐλάμβανε*; *ἄρχεσθαι*, *ἄνωθεν ἀρξάμενον*; *ἐγγίγνεσθαι*, *ἐλκώσεως ἐγγυνομένης*; *ἐπιγίγνεσθαι*, *παρμὸς καὶ βράγχος ἐπεγίγνετο*; *ἐπιέναι*, *ἀποκαθάρσεις χολῆς ἐπήμαν*; *ἐμπίπτειν*, *λύγξ ἐνέπιπτε κενή*; *ἐπιπίπτειν*, *διαρροίας ἐπιπιπτούσης*.

Admitted, but seldom, by the doctors are *ἐπικεῖσθαι* (*ἀγρυπνία ἐπέκειτο*, cf. *Vict.*<sup>3</sup> 73. 10 (iv. 392 J.) *κίνδουνοι ἐπικεῖνται κακοί*; Ehlert omits this, and quotes *Prorrh.* 2. 23 (ix. 52 L.), where—as in *Morb.*<sup>4</sup> 57 (vii. 612 L.)—the meaning is quite different); and *\*κατασκήπτειν* (*κατέσκηπτε γὰρ ἐς αἰδοῖα*, cf. *Epid.*<sup>3</sup> *cat.* 8. 8 (i. 248 J., i. 228 K.) *πολλοῖσι . . . αὐτὸ τὸ νόσημα ἐς τοῦτο κατέσκηψεν*).

Of the progress of disease through the body:

**καταβαίνειν**: *κατέβαινε ἐς τὰ στήθη ὁ πόνος*. This is quite common in the doctors, e.g. *Prog.* 11. 42 (ii. 24 J., i. 89 K.) *ὑποκαταβάς ἐς τὰ κάτω χωρία*, *Acut.* 20. 6 (ii. 78 J., i. 119 K.) *ὅταν δὲ ἡ θέρμη καταβῆ ἐς τοὺς πόδας*, *Aph.* 6. 22 (iv. 184 J.) *ρήγματα ἐκ τοῦ νώτου ἐς τοὺς ἀγκῶνας καταβαίνει*, *Flat.* 12. 6 (ii. 246 J., p. 98 H.) *οἰδήματα ἐς τὰς κνήμας καταβαίνει*; see further Ehlert, *op. cit.*, p. 105, n. 15.

**\*ἐπικατιέναι**: *ἐπικατιόντος τοῦ νοσήματος ἐς τὴν κοιλίαν*. This is a very rare compound, hardly to be found outside the doctors: *morb. sacr.* 10. 9 (ii. 158 J.) *φλέγμα ἐπικατελθὸν ἐς τὰς φλέβας*, *nat. puer.* 30 (vii. 534 L.) *ἐτέρων ἐπικατελθόντων . . . ἐς τὰς μήτρας*.

**διεξιέναι**: *διεξίημι γὰρ διὰ παντός τοῦ σώματος*. Cf. *V.M.* 16. 43 (i. 44 J., i. 19 K., p. 48 H.) *πυρετός διεξιὼν διὰ παντός*, *Aff.* 26 (vi. 238 L.) *αἵματος διεξιόντος*, *Epid.*<sup>5</sup> 20 (v. 220 L.) *χολή . . . διεξίημι*, *morb.*<sup>3</sup> 14 (vii. 134 L.) *τὰς τροφὰς . . . διεξιέναι*.

**ιδρύσθαι**: τὸ ἐν τῇ κεφαλῇ πρῶτον ἰδρυθὲν κακόν, of the *settlement* of an ailment in part of the body. Cf. *Coac.* 309 (v. 652 L.) πόνος ἐς στῆθος ἰδρυθεῖς, *Prorrh.* 1. 70 (v. 576 L.) ὀδύνη ἐς στῆθος ἰδρυθεῖσα, *Epid.*<sup>6</sup> 7. 1 (v. 334 L.) τὰ νυκταλωπικὰ ἰδρύετο; contrast (i) *Aph.* 4. 11 (iv. 136 J.) εἰς ὕδρωπα ξηρὸν ἰδρύετο, the disease 'settled down into a dropsy'; (ii) *Epid.*<sup>3</sup> case xv (i. 282 J., i. 244 K.) πάλιν ἰδρύθη, the patient 'settled down again', cf. *Epid.*<sup>4</sup> 13 (v. 150 L.), *Epid.*<sup>6</sup> 2. 6 (v. 280 L.), *Prorrh.* 1. 20 (v. 516 L.); (iii) *Epid.*<sup>4</sup> 14 (v. 152 L.) ἰδρύμενον, of urine, sim. *Epid.*<sup>5</sup> 64 (v. 242 L.), of stools.

Of the waxing and waning of disease:

**ἀκμάζειν**: ὁσονπερ χρόνον καὶ ἡ νόσος ἀκμάζου. Cf. *Prog.* 3. 23 (ii. 12 J., i. 82 K.) τῆς νόσου ἀκμαζούσης, *Acut.* 35. 6 (ii. 90 J., i. 125 K.) ἀκμαζόντων τῶν νοσημάτων, *Aph.* 1. 8 (iv. 102 J.) ὅταν ἀκμάζη τὸ νόσημα.

**λωφᾶν**: μετὰ ταῦτα λωφήσαντα. Rare in the doctors; I have noticed only *Aff.* 29 (vi. 240 L.) ὅταν δὲ λωφήσῃ ἡ ὀδύνη, and *Int.* 49 (vii. 290 L.) ὀδύνη . . . λωφᾶι.

Of the actions, reactions, and sufferings of the patients:

**προκάμνειν**: εἰ δὲ τις προύκαμνέ τι . . . κάμνειν, 'to be ill', is a standard term in the doctors. With προύκαμνε compare *Epid.*<sup>4</sup> 31 (v. 174 L.) προέκαμνεν, *Epid.*<sup>5</sup> 24 (v. 224 L.) προησθένει, 7 (v. 148) προηληγηκότι, *Aph.* 4. 33 (iv. 142 J.) προπεπονηκώς.

**ἀφιέναι**: πνεῦμα . . . ἠφίει. Not uncommon, e.g. *Epid.*<sup>6</sup> 4. 22 (v. 314 L.) ψυχρὸν πνεῦμα ἀφίειεν, *morb.*<sup>4</sup> 57 (vii. 610 L.) τὸ πνεῦμα πυκνὸν ἀφίει, *morb. sacr.* 4. 29, 7. 6 (ii. 146, 154 J.).

**καίεσθαι**: τὰ τε ἐντὸς οὕτως ἐκάετο, of sensations of burning. Very common in the doctors; with Thucydides' phrase compare *morb.*<sup>1</sup> 29 (vi. 198 L.) τὰ μὲν ἔνδον καίονται, *Aph.* 4. 48 (iv. 148 J.) τὰ δὲ ἔνδον καίηται, 7. 73 (iv. 212 J.) τὰ δὲ ἔσω καίηται, *morb.*<sup>2</sup> 41 (vii. 58 L.) ἔσωθεν δὲ καίεται.

**ἀνέχεσθαι**: μήτε . . . ἱματίων . . . ἐπιβολὰς . . . ἀνέχεσθαι. A standard term.

**ἀμελείσθαι**: τῶν ἡμελημένων ἀνθρώπων. Of lack of nursing attendance, a standard term.

**κυνέχεσθαι**: τῇ δίψῃ ἀπαύστῳ ξυνεχόμενοι. Of being in the grip of pain, disease, etc., ἔχεσθαι is a standard term.

**ἡσυχάζειν**: ἡ ἀπορία τοῦ μὴ ἡσυχάζειν. The standard term for *restfulness* in the doctors is ἀτρεμεῖν, -ίλειν, but ἡσυχάζειν occurs quite often, e.g. *Int.* 8 (vii. 186 L.), 10 (vii. 192 L.), *morb.*<sup>3</sup> 16 (vii. 148 L.), *nat. mul.* 12 (vii. 328 L.), *Art.* 87. 8 (iii. 396 J., ii. 244 K.).

**\*μαραίνεσθαι**: τὸ σῶμα οὐκ ἐμαραίνεται. Of the decay of physical strength or diminution of bulk, quite common, e.g. *nat. hom.* 12. 37 (iv. 36 J.), *Vict.*<sup>1</sup> 35 (iv. 282 J.), *morb.*<sup>1</sup> 6 (vi. 204 L.).

**ἀντέχειν**: ἀντέειχε παρὰ δόξαν τῇ τάλαιπωρία. Of resistance to disease, very rare in the doctors; *V.M.* 3. 31 (i. 18 J., i. 4 K., p. 38 H.) πλείω χρόνον ἀντέχειν.

**διαφθείρεσθαι**, of the decease of the patient. Thucydides uses this verb several times in this context. As a general rule the doctors reserve it to denote the corruption or deterioration of the body or part thereof, but it is freely used in the Thucydidean sense by the authors of *morb.*<sup>1</sup> and *Aff.*, sporadically elsewhere, e.g. *Art.* 11. 5 (iii. 222 J., ii. 127 K.), *Int.* 8 (vii. 186 L.), 48 (vii. 288 L.).

**διαφεύγειν**: εἰ διαφύγειν, of escape from disease. A standard term.

**περιγενέσθαι**: εἴ τις ἐκ τῶν μεγίστων περιγένειτο, of survival. A standard term.

**στερίκεσθαι**: στερικόμενοι τούτων διέφευγον, of loss of eyes, limbs, sim. I have not noticed this verb in the doctors, but such expressions as *στερήσειε*

ὀφθαλμῶν (*Epid.*<sup>1</sup> 12 fin. (i. 164 J., i. 190 K.)), ὀφθαλμῶν στέρησις (*Coac.* 288 (v. 648 L.)) show that Thucydides is not diverging far from the medical norm.

ἀναστῆναι, of patients rising from bed. A standard term. With Thucydides' phrase, παραντίκα ἀναστάντας, compare, for example, *Hum.* 7 (iv. 78 J.) ἀνισταμένοις ἐκ τῶν νοῦσων αὐτίκα. . . .

ἀγνοεῖν: ἠγνόησαν σφᾶς τε αὐτοὺς κτλ., of failure to recognize, through loss of memory, delirium, sim. Common in the doctors.

All the above-mentioned verbs except *περίσκεισθαι* are either standard terms in the doctors or at least admitted by them. Most of them are common in other kinds of writing also. There remain a few which require special attention.

First, verbs which are apparently unexampled, at least in these senses, in the *Hippocratica*:

(i) †ἐνδιδόναί: λύγξ σπασμὸν ἐνδιδοῦσα ἰσχυρόν, apparently 'inducing', 'exciting'. The verb is commonly used in this sense by medical writers of a much later era (Dindorfs' *Lexicon* s.v., col. 1032); but I have not noticed an example in the Hippocratic Corpus, where ἐνδιδοῦναι is normally used intransitively, in the sense 'get better'.

(ii) †ἀνατρέφειν: (ὁ πόνος) ἀνέστρεφε (τὴν καρδίαν). The exact meaning is elusive. Galen's comment (xviii. 2. 286 Kühn), τὸ ἀνατρέφειν ἐπὶ τῆς πρὸς ἔμετον ὀρμῆς εἶπε, shows how he understood it, but not necessarily what Thucydides intended. I have not noticed the verb in the doctors except at *cord.* 1 (vi. 80 L.), where, however, καρδίῃ ἀνατρέφεται means 'the heart dwells in . . .'. The noun ἀνατροφή in *Praes.* 4 (i. 316 J., p. 31 H.) seems to me to throw no light on the problem. If καρδία in Thucydides means 'cardiac orifice of the stomach', we should readily understand the verb to mean 'upset', 'caused a disturbance in'; if it means 'heart', there is no special difficulty in the same interpretation, 'caused turmoil and disorder' in the heart (exactly as in Alciphron, *Letters* 4. 17. 8 (Benner) ἡ καρδία μου ἀνέστραπται).

Secondly, verbs which are used by Thucydides in senses more or less confined to medical writings:

(i) \*στηρίζειν, intransitive, with ἐς+accusative: ὁπότε ἐς τὴν καρδίαν στηρίζειν (ὁ πόνος), of an ailment settling in a part of the body. This is fairly common in the doctors and (so far as I can discover) unexampled elsewhere. Cf. *Aff.* 29 (vi. 240 L.) καθ' ὁκοῖον ἂν τυγχάνη τοῦ σκέλεος στηρίζουσα ἡ ὀδύνη, *Aph.* 4. 33 (iv. 142 J.) ἐνταῦθα στηρίζει ἡ νοῦσος, *Aff.* 17 (vi. 216 L.) ἐς ὃ τι ἂν καταστηρίξῃ τὸ φλέγμα; see further Ehlert, *op. cit.*, p. 122.

(ii) \*ἐπισημαίνειν: τῶν γε ἀκρωτηρίων ἀντίληψις αὐτοῦ ἐπεσήμαυεν, 'seizure of the extremities showed itself, appeared as a symptom'. This intransitive usage of ἐπισημαίνειν, with an ailment or symptom for subject, and with the meaning 'show upon' (a person, limb, etc., this remoter object being in the dative case when expressed), is perhaps confined elsewhere to the doctors and to Aristotle and his school. Cf. *Epid.*<sup>3</sup> 5. 4 (i. 244 J., i. 226 K.) φωναί τε πολλοῖς ἐπεσήμαινον κακούμεναι, 'voices showed in many cases as being impaired', *Hum.* 18 (iv. 92 J.) ὅσαι ἐφ' οἷοισιν ὕδασις ἢ ἀνέμοισι νοῦσοι ἐπισημαίνουσι, 'what diseases show themselves in conjunction with the various rains and winds', *Art.* 67. 21 (iii. 358 J., ii. 220 K.) τεταρταῖα γὰρ ἔοντα ἐπισημαίνει τῆσι παλιγκοτήσι μάλιστα, 'in cases of exacerbation, symptoms appear principally on the fourth day'. Sometimes it is uncertain whether the usage is impersonal, or a subject should be supplied from the context: *Epid.*<sup>7</sup> 46 (v. 414 L.) ἐπεσήμαυε τῆ

γλώσσει, 'symptoms appeared on the tongue' or '[the disease] showed itself on the tongue', *Epid.*<sup>1</sup> 18. 6 (i. 172 J., i. 194 K.) τοῖς κανώδεσιν ἀρχομένοισιν ἐπεσήμαιεν, 'in cases of fever, symptoms appeared from the beginning' or '[signs of death] showed themselves from the beginning'. Further examples in Ehlert, op. cit., p. 112.

(iii) \*ἐξανθεῖν: *σῶμα* . . . φλυκταίναις μικραῖς καὶ ἔλκεσιν ἐξηνηθικός, of the efflorescence of blisters and lesions on the body. Similar uses of the verb are to be found in poetry of the fifth century B.C.; but here in Thucydides the medical background is unmistakable. ἐξάνθημα is a standard and very common term in the doctors, applied to a variety of swellings and rashes and eruptions between which we should differentiate. For example, in *Epid.*<sup>5</sup> 93 (v. 254 L.) ἐξανθήματα are likened to mosquito-bites, οἷα τὰ τῶν κωνώπων δήγματα (sim. *Coac.* 553 (v. 710 L.), *Epid.*<sup>7</sup> 104 (v. 454 L.)); in *Epid.*<sup>7</sup> 43 (v. 410 L.) they are compared to burn-blisters, ἐξανθήματα . . . ὡσπερ πυρίκαντα; in *Epid.*<sup>5</sup> 2. 15 (v. 284 L.) they are 'broad' or 'flat', πλατέα ἐξανθήματα; in *Coac.* 238 (v. 636 L.) a reddening of the skin is compared to 'exanthismata', χρώς ἐρυθραίνεται οἷον ἐξανθίσματα; in *Epid.*<sup>2</sup> 7 (v. 78 L.) they are classed with lesions, ἔλκος καὶ τὰ τοιαῦτα ἐξανθήματα; in *Coac.* 435 (v. 682 L.), ἐξανθίσματα are described as 'scratch-like', ἀμυχώδεα. Here in Thucydides the verb describes the appearance of blisters (φλύκτασθαι) and open sores or lesions (ἔλκη): cf. *morb. sacr.* 8. 18 (ii. 156 J.) ἐξανθεῖ ἔλκεα, *Aph.* 3. 20 (iv. 128 J.) ἐξανθήσει ἐλκώδεες, *Epid.*<sup>2</sup> 3. 1 (v. 102 L.) τρηχύσματα . . . ἐξανθήσαντα; *de Arte* 9. 8 (ii. 206 J., p. 15 H.) τὰ ἐξανθεῦντα. Galen's description of the great plague of which he was an eyewitness borrows the Thucydidean terms, ἐξήνησεν ἔλκεσιν ὄλον τὸ σῶμα (quoted by Littré, v. 65).

(iv) †ἀποκριθῆναι: εἰ δέ τις καὶ προύκαμνέ τι, ἐς τοῦτο πάντα ἀπεκρίθη, 'all previous ailments were separated off into the Plague', 'in hunc morbum secreta concesserunt' (Poppo-Stahl). This verb is a standard technical term in the doctors, especially signifying the secession of an element from a compound, of a unit from a plurality: *V.M.* 14. 37 (i. 38 J., i. 16 K., p. 46 H.) ὅταν τι τούτων (sc. salt, sweet, bitter, sim.) ἀποκριθῆι καὶ αὐτὸ ἐφ' ἑωυτοῦ γένηται, 'when one of those is separated off and stands alone'; *morb. sacr.* 13. 23 (ii. 166 J.) οὕτως ἀπεκρίθη καὶ ἐπικατερρήη τὸ φλέγμα, 'the phlegm separates off and flows down'; *Vict.*<sup>4</sup> 89. 87 (iv. 432 J.) τὰ ἐς τὴν κοιλίαν ἀποκρινόμενα, 'what separates itself off into the belly'; *Prog.* 23. 31 (ii. 48 J., i. 104 K.) ὁκόταν δὲ ἀποκριθῆι ἡδὴ ὁ δὴ σταφύλην καλέουσιν, 'when what they call the *grape* [a swelling at the end of the uvula] is separated off', i.e. when a general swelling determines into this particular shape and place. I do not think that Thucydides has used this verb exactly as the doctors use it: he means that a variety of diseases determined into one particular disease, the Plague; that is not exactly the same as the meaning in *Prog.*, loc. cit., though it is similar (a general swelling determines into one particular swelling). *Vict.*<sup>1</sup> 28. 10 (iv. 266 J.) is identical in construction, ἐς ἄρσενα τὰ σώματα ἀποκριθέντα, 'bodies separated off into the category of males', though the context there demands a different meaning for the verb. I have not found an exact parallel to Thucydides' usage; but it is at least clear that the best illustrations are provided by the medical writers.

In summary: 30 out of 39 verbs are standard or at least quite common terms in the doctors, including a few more or less confined to them. Of the

remaining nine, six are found, though not often, in the doctors; only three are apparently missing from the medical vocabulary.

It remains to comment briefly on a few terms which fall outside the foregoing categories:

(i) \*ἄπαυτος: τῆι δίψηι ἀπαύτωι ξυνεχόμενοι. It may be by inadvertence that I have not noted this adjective in the doctors.

(ii) πρόφασις: ἀπ' οὐδεμιᾶς προφάσεως. This is the standard term in the doctors for the 'exciting cause' of a disease. Here, as elsewhere in Thucydides, it is used in its medical sense: 'This word, which in Homer, Herodotus, and later writers, unquestionably means "formulated reason" or "pretext", . . . is uniformly used by Hippocrates in the sense of "exciting cause", and has been taken over directly by Thucydides in his attempt to apply the methods of medicine to history'.<sup>1</sup>

(iii) \*ποτόν: τό τε πλέον καὶ ἔλασσον ποτόν. This is the normal word (much commoner than πόσις, πόμα) for 'a drink' in the doctors.

(iv) δύναμις: ἔτι ἔχοντές τι δυνάμειως, of the physical strength of the patient. The standard noun in the doctors is ἰσχός (*Epid.*<sup>5</sup> 26 (v. 224 L.) ἕως ἐπι ἰσχύν τινα εἶχεν): δύναμις in this sense is very rare (*Prog.* 1. 20 (ii. 8 J., i. 79 K.) τὴν δύναμιν . . . τῶν σωματίων), though the opposite is commonly described by ἀδυναμία, ἀδύνατος, -εῖν; δύναμις is generally reserved for the meaning 'property', 'function', 'force', of cold, heat, humours, sim.

(v) ἀντίληψις: τῶν ἀκρωτηρίων ἀντίληψις, of seizure by disease of parts of the body. This noun occurs in *Off.* 9. 20 (iii. 66 J., ii. 36 K.), of the grip of a bandage on a limb; I have not noticed it elsewhere in the doctors.

(vi) \*ἀποκάθαρσις: ἀποκαθάρσεις χολῆς . . . ἐπήσαν, of the purgation brought about by vomiting. κάθαρσις is a standard term in the doctors in this sense; I have not noticed the compound noun, but the verb ἀποκαθαίρεσθαι is very common.

The patient may be 'purged' either ἄνω (by vomiting) or κάτω (by stool). Ehlert, *op. cit.*, pp. 107 f., alleges that Thucydides here writes contrary to the medical idiom, in which ἀποκαθαίρεσθαι is confined to purgations κάτω (the same point had been made, but more cautiously, by Brandeis, p. 20, n. 19). It is relevant to quote a few examples, assembled without special search, which bluntly contradict this allegation: *Epid.*<sup>7</sup> 93 (v. 450 L.) ἀπεκαθάρθη, of a φαρμακὸν ἄνω; *morb.*<sup>1</sup> 12 (vi. 160 L.) οὐδ' ἔτι ἀποκαθαίρεται ἀπ' αὐτοῦ ἄνω οὐδέν; *morb.*<sup>3</sup> 9 (vii. 128 L.) ἀποκαθαίρειν ἄνω; presumably also *morb.*<sup>2</sup> 27 (vii. 44 L.).

The chapters neighbouring 49 include many words and phrases which are standard or common terms in the doctors: for example, 48. 2 (νόσος) ἤψατο τῶν ἀνθρώπων, 50. 1 προσέπιπτεν, 51. 1 οὐδέν τῶν εἰωθότων, ἐς τοῦτο ἐτελεύτα, 51. 2 \*ἴαμα, 51. 3 σῶμα αὐταρκές (cf. *Liqu.* 5 (vi. 128 L., p. 88 H.)), νόσος πάντα ἔξυνήρει, τὰ πάσῃ διαίτη θεραπευόμενα, 51. 4 τὸ ἀνέλπιστον, 51. 5 φθορὸν τοῦτο ἐνεποιεῖ, τῶν ἀπογιγνομένων, 51. 6 κτείνειν (of disease), 52. 1 ἐπίεσε, 54. 5 \*ἐπενείματο (cf. *Epid.*<sup>3</sup> *cat.* iv. 7 (i. 240 J., i. 225 K.)). Most of these are illustrated by Ehlert, *op. cit.*; I select a few for special mention:

(i) 50. 1 τὸ εἶδος τῆς νόσου, 51. 1 τὸ νόσημα . . . τοιοῦτον ἦν ἐπὶ πᾶν τὴν ιδεάν: νόσου (-ήματος) εἶδος, ιδέα, are very common terms in the doctors.

<sup>1</sup> Cochrane, *op. cit.*, p. 17. Ehlert observes that in 29 out of 43 examples of the singular number in the doctors, πρόφασις

occurs in the genitive case governed by a preposition, as in Thuc.

(ii) 50. 1 τῶν \*ξυντρόφων τι, of *familiar* diseases: a medical term, cf. *Aēr.* 7. 24 (i. 84 J., i. 41 K., p. 60 H.) τὸ νόσημα αὐτοῖσι ξύντροφόν ἐστι, *morb. sacr.* 13. 36 (ii. 168 J.) ἦν μὴ ἐκ παιδίου ξύντροφος ἦι, *Epid.*<sup>6</sup> 5. 3 (v. 316 L.) νοῦσοι ξύντροφοι ἐν γήραι καὶ διὰ πεπασμὸν λείπουνσι.

(iii) 51. 4 ἀθυμία, of depression, low spirits: quite common, cf. *Coac.* 6 (v. 598 L.), *Epid.*<sup>3</sup> case 2 (i. 262 J., i. 235 K.), *Epid.*<sup>5</sup> 84 (v. 252 L.), *Epid.*<sup>7</sup> 89 (v. 446 L.); *δυεθυμία* is commoner, indeed the standard term in some treatises.

There remain two terms, both nouns of broad meaning, of which it may be said that Thucydides' usage is in conflict with medical parlance:

(i) 49. 1 ἔτος . . . ἄνοσον ἐς τὰς ἄλλας ἀσθενείας: ἀσθενείας here means 'illnesses'; it is worth noticing that the doctors regularly distinguish between the noun and the verb—ἀσθενεῖν means 'to be ill', but ἀσθένεια means 'lack of physical strength', not 'illness'. From many examples I select *V.M.* 12. 4 (i. 32 J., i. 12 f. K., p. 43 H.) ἐγγύτατα . . . τοῦ ἀσθενέοντός ἐστιν ὁ ἀσθενής, 'a weak body is one stop removed from a sick one'; cf. *Acut.* 43. 2 (ii. 98 J., i. 130 K.). In *Thuc.* 49. 7 the noun recurs, this time in the medical sense, 'feebleness'.

(ii) 49. 3 μετὰ ταλαιπωρίας μεγάλης, 49. 6 ἀντεῖχε . . . τῆι ταλαιπωρίαι: in both places *ταλαιπωρία* denotes the general *distress* of the malady. This noun and its cognates in the doctors are reserved for the meanings 'physical exercise' and 'physical effort'. From numerous examples I select *Acut.* 47. 8 (ii. 102 J., i. 133 K.), where *ταλαιπωρία* is contrasted with *σχολή*; and *nat. hom.* 9. 6 (iv. 24 J.), where it is contrasted with ἀργίη. I have not noted an example of the Thucydidean sense in the doctors.

The conclusions of this part of the inquiry may be summarized as follows:

(i) The great majority of the nouns, adjectives, and verbs in chapter 49 recur as standard terms, apparently for the most part with the same meanings, in medical writings of the fifth and fourth centuries B.C. This may fairly be said of some 77 out of 94 terms considered; about half the Thucydidean ἀπαξ εἰρημένα in chapter 49 recur in the short treatise *Prognosticon* alone.

(ii) All except half a dozen of the Thucydidean terms are exemplified in the doctors; and of those half-dozen, several are closely related to the standard terminology.

(iii) Some of Thucydides' terms are seldom, and a few never, found elsewhere except in medical and similar scientific treatises; others, though found elsewhere, are specially characteristic of medical writers.

(iv) None of Thucydides' technical terms, and only two of his general terms (*ταλαιπωρία*, *ἀσθένεια*), are in conflict with medical usage.<sup>1</sup>

In the light of the foregoing investigation I translate the chapter in question thus:

'It was generally agreed that in respect of other ailments no season had ever been so healthy. Previous diseases all turned off into the plague; and

<sup>1</sup> I ought perhaps to have said something somewhere about Lucretius' imitation of *Thuc.* in 6. 1138 ff. The position is apparently quite simple: from 1138 to 1181 and again from 1197 onwards *Lucr.* follows *Thuc.* closely, with a few additions and embellishments (1150, 1202-3) and one or two mistakes (esp. 1209 *ferro*: I am not convinced by Maas's explanation in *Bailey's Lucretius*, p. 1758). In the midst of all this he inter-

polates a passage (1182-96) based on well-known Hippocratic sources which have nothing whatever to do with the Athenian Plague. It is an extraordinary procedure for a scientific writer; but the only point of importance at present is that there is no reason to believe that *Lucr.* knew anything about the Plague beyond what he found in *Thuc.*, or that he read *Thuc.* in any other form than what we possess today.

the rest of the people were attacked without exciting cause, and without warning, in perfect health. It began with violent sensations of heat in the head, and redness and burning in the eyes; internally, the throat and tongue were blood-red from the start, emitting an abnormal and malodorous breath. These symptoms developed into sneezing and hoarseness, and before long the trouble descended into the chest, attended by violent coughing. Whenever it settled in the heart, it upset it, and evacuations of bile ensued, of every kind for which the doctors have a name; these also together with great distress. Most patients suffered an attack of empty retching, inducing violent convulsions, in some cases soon after the abatement of the previous symptoms, in others much later. The body was neither unduly hot externally to the touch, nor yellowish in colour, but flushed and livid, with an efflorescence of small blisters and sores. Internally, the heat was so intense that the victims could not endure the laying-on of even the lightest wraps and linens; indeed nothing would suffice but they must go naked, and a plunge into cold water would give the greatest relief. Many who were left unattended actually did this, jumping into wells, so unquenchable was the thirst which possessed them; but it was all the same, whether they drank much or little. The victims were attacked throughout by inability to rest and by sleeplessness. Throughout the height of the disease the body would not waste away but would hold out against the distress beyond all expectation. The majority succumbed to the internal heat before their strength was entirely exhausted, on the seventh or ninth day. Or else, if they survived, the plague would descend to the bowels, where severe lesions would form, together with an attack of uniformly fluid diarrhoea which in most cases ended in death through exhaustion. Thus the malady which first settled in the head passed through the whole body, starting at the top. And if the patient recovered from the worst effects, symptoms appeared in the form of a seizure of the extremities: the privy parts and the tips of the fingers and toes were attacked, and many survived with the loss of these, others with the loss of their eyes. Some rose from their beds with a total and immediate loss of memory, unable to recall their own names or to recognize their next of kin.'

#### PART II. *The Nature of the Plague*

The layman who expresses opinions about matters within the province of medical science must not complain if he finds himself the target of criticism or even abuse. It is very improbable that such opinions should be of the least value to anybody; and I shall be careful to express none, or very few. What follows is confined (so I believe and intend) to observations of alleged fact. The claims of reasonable brevity demand that my phraseology should be in this respect misleading: when I say (for example) that loss of memory is a common sequel to typhus fever, or any such statement of apparent fact, I mean not that I know this to be so but that this statement will be found in modern medical textbooks and treatises on the subject in question. If it should happen to be an incorrect statement, I have no defence; neither have the medical textbooks.

I must further make it clear that my aim is directed at a single target, a matter of fact, not of opinion: viz. that among modern descriptions of comparable length and scope there is one which so closely resembles the Thucy-

didean description that the question must be asked whether the two are identical. Let medical writers, if they can and will, assure us that the two are, despite the obvious resemblance, not the same: that will be a further stage of the inquiry, in which the layman is not qualified to participate. I am only asking the question; not (except for the sake of argument) answering it. My position is that I do not see how further progress can be made until the medical scientist informs us (if he can) in what respects (if any) the obvious resemblance is misleading.

With these provisos (prompted by the desire to avoid the grosser misunderstandings) I proceed to consider the identification of the Plague, starting with a few observations arising out of Part I.

It is now established that Thucydides has studied his theme carefully; that he suffered the Plague himself; and that he has recorded his observations with the highest degree of technical accuracy which the time and circumstances permitted. There follows a point of the highest importance, constantly overlooked—*that obviously significant phenomena, which could have been observed, but which are not mentioned by Thucydides, did not occur.* To those who know the manner and method of Thucydides, this inference will appear self-evident. It is quite out of the question that he should have omitted to mention matters so obvious and important as those which follow, if they did in fact occur. The most conspicuous absentees are:

(i) Physical prostration at an early stage. This symptom is excluded not negatively but positively. Thucydides says that patients, if left unattended, would throw themselves into cold water or wells: such patients were thus capable of unassisted walking or at least crawling, and indeed of a considerable physical effort. Thucydides adds explicitly that the majority died on the seventh or ninth day 'before their strength was exhausted', and stresses the observation that the body did not lose its power at the height of the disease, but resisted to an unexpected extent.

(ii) Dysentery. Thucydides uses the term, together with its standard adjective, by which the doctors distinguished diarrhoea from dysentery. He not only does not mention dysentery, but positively uses terms incompatible with it.

(iii) Mental disorder. The Greek doctors have a remarkably extensive vocabulary, descriptive of a wide variety of types, to denote the forms of mental derangement which were commonly associated with certain familiar diseases. Thucydides says nothing whatever about delirium, or coma, or indeed about any other effect on the mind except depression (*ἀθυμία*) and, in some cases, loss of memory in the convalescent stages.<sup>1</sup>

We shall therefore not acquiesce in the identification of Thucydides' Plague with any disease of which physical prostration in the early stages, dysentery, or mental disturbance is a signal characteristic.

If we now turn to the positive features of the description, we shall observe that four principal periods are distinguished:

(1) The period of incubation. There was no gradual sickening, no apparent

<sup>1</sup> Those who try to identify Thuc.'s Plague with a disease of which some sort of mental disorder is characteristic either fail to notice that this feature is wanting in his account or adopt the doubtful expedient of

arguing that the patients *must* have been mentally deranged or they would not have thrown themselves into wells; as if Thuc. had not explicitly given an entirely different (and sufficient) reason for this action.



exciting cause; the outbreak was sudden, and the patient passed from health to sickness in a moment.

(2) A period of seven or nine days, during which the Plague ran its full fatal course with the majority. This part of the description falls into two sections:

- (a) The order in which the principal symptoms appeared: *First* (πρῶτον) a feverish sensation in the head; inflammation of the eyes; redness of throat and tongue; unnatural and offensive breath. *Then* (ἔπειτα) sneezing and hoarseness. *Soon afterwards* (ἐν οὐ πολλῶι χρόνῳ) invasion of the chest, violent coughing; invasion of the heart; vomiting of bile; general distress; unproductive retching; convulsions.
- (b) Phenomena observable generally throughout this period: flushed and livid skin; an efflorescence of blisters and sores; absence of heat to the touch, strong sensation of heat internally; unquenchable thirst; restlessness and sleeplessness; depression.

(3) A period following the seventh or ninth day, in cases of survival. The patient suffered lesions of the intestines, diarrhoea, and weakness ending in death.

(4) A period of further complications, in cases where the patient survived the preceding period. There ensued gangrene of the extremities; loss of sight; in some cases, loss of memory.

From the adjacent chapters we learn a few more general facts: that the Plague was infectious (47. 4; 50. 1; 51. 4); that it was a disease unknown to the physicians (47. 4; 51. 1 f.; this fact is implied throughout); that carrion-birds and beasts abstained from infected corpses (50. 2); and that the Plague did not attack the same person twice, at least not with fatal effect (51. 6).

Some defects have been justly charged against this description:<sup>1</sup> but they are slight blemishes on a lucid, systematic, and detailed narrative expressed with a high degree of technical accuracy. The evidence, both negative and positive, should be sufficient for identification.<sup>2</sup> Thucydides has described an

<sup>1</sup> Among the defects alleged by modern medical writers the only one of any importance, which must be acknowledged, is the inadequate description of the exanthem. At what stage did it first appear? Did both the *φλύκταιναι* and the *ἔλκη* exist side by side, or did the former develop into the latter? What size and shape were they? How long did they last? What was the process of the disappearance in cases of survival—did they peel, or flake, or what? Other charges of inadequacy are less appropriate: (i) Thuc. does not mention the pulse: true, but the significance of the pulse in relation to health was not, so far as we know, appreciated by the doctors until after the lifetime of Thuc. (ii) He does not refer to the condition of the urine: but that may be because there was nothing significant to record; I notice that standard modern accounts of the disease with which we shall shortly identify Thuc.'s Plague include no reference to the urine. (iii) Thuc. gives too little detail about the

development and duration of individual symptoms, and does not distinguish systematically enough between the various stages in the progress of the Plague: I think it a fair comment that descriptions of such diseases in modern medical textbooks are not much superior in these respects. (iv) Brandeis (p. 62) complains that Thuc. does not distinguish between invariable and occasional phenomena: this is plainly unjust; Thuc. states explicitly (51. 1) that he describes the invariable phenomena, omitting individual deviations from the norm.

<sup>2</sup> At least we must continue to try until failure is proven; which is not yet. And ultimate failure need not mean that Thuc.'s description is at fault, for (1) his Plague might be a disease now apparently extinct, like the English 'sweating-sickness', 1485–1552, 'suetie des Picards', 1718–1870; (2) there is no proof that the characteristics of a disease remain sufficiently constant over so long a period of time.

acute exanthematous disease beginning with fever and a disorder of the upper respiratory passages, and ending in death or in complications including especially intestinal lesions, gangrene of the extremities, and loss of eyesight. A curious feature of the description is the statement that the patients suffered so severely from 'internal heat' that many, left unattended, would throw themselves into cold water.

Now Thucydides makes it clear enough that this was a 'new' disease. We have to reckon with the impact of an acute infectious disease on a society which had not been exposed to it before. When we look for its modern counterpart, we must make allowance for the possibility that a society which has been exposed to a particular disease for a long period of time may suffer, both in the individual and in the community, much less severely than a society which has not been exposed to it before. I read, and am told, that the cause of this effect is a subject of controversy. I claim no competence to discuss it, and think that it is not necessary for me to do so. It is the effect, not the cause, which concerns the present inquiry. Modern records prove beyond question that diseases which are seldom fatal in societies which have long been exposed to them may have very high rates of mortality in societies which have not been exposed to them. It may be the case that diseases lose their power over exposed societies; or it may be the case that the apparent intensification of that power over unexposed societies is to be explained rather through deficiency of medical treatment, and the patients' own folly and inexperience, which allow the disease to develop its utmost power unchecked, and to induce subsequent complications which proper care and treatment could have averted. But however doubtful the cause, the effect is certain: when we look for the modern counterpart to Thucydides' Plague, we must remember that what was so violent and so often fatal at Athens may be represented in modern civilized society by a relatively mild ailment. We shall therefore include in our search modern records of epidemics in unexposed societies; and, if we make an identification, we shall not be surprised to find that a particular symptom occurs *less* often or with *less* violence today.

This is the moment at which I must make it plain that the general conclusion of this paper was first stated a year earlier by an historian of medical science. Dr. R. Williamson, Reader in Pathology in the University of Cambridge, whom I consulted at this stage, drew my attention to an article by J. F. D. Shrewsbury, of the University of Birmingham, published in the *Bulletin of the History of Medicine*, xxiv (1), Jan.-Feb. 1950, pp. 1-25. What follows here, however different in detail and in presentation, is in several most important points directly indebted to that article.

Shrewsbury stresses the need to examine modern records of the impact of infectious exanthematous diseases on unexposed societies, and reviews the history of the study of Thucydides' Plague by modern medical writers. It appears that the majority have pronounced in favour of smallpox; that typhus fever runs a good second, bubonic plague a poor third; that typhoid fever has had some fanciers; and that a number of medical authorities have declared identification to be impossible.

(1) *Smallpox*. The principal reasons for elimination are:

(i) Physical prostration at an early stage is characteristic of smallpox. The patient is 'neither desirous nor capable of leaving his bed, except perhaps occasionally under the spur of a purposeless delirium'. Here we find two of the

three most conspicuous absentees from Thucydides' description—prostration at an early stage, and delirium.

(ii) There is no mention in Thucydides of that pain in the loins and back which 'appears in no other acute febrile disease so frequently or with such intensity,' and which is a signal characteristic of smallpox.

(iii) It is out of the question to suppose that Thucydides could have failed to observe, or to think worth recording, the pits left all over the body, particularly on the face, after the rash of smallpox. He himself must have suffered this disfigurement.

(iv) From many other inconsistencies I select one only for mention: the fact that gangrene is not a complication associated with smallpox.<sup>1</sup>

(2) *Typhus fever*. The onset is rapid, with severe headache, suffused eyes, and foul breath. Hoarseness is common, cough and some kind of bronchial disorder universal. Vomiting is not characteristic, but may occur. The body suffers internally a strong sensation of heat, which may not be apparent to the touch. The skin-eruption may be livid in colour as well as red. Further developments include gangrene of the intestine, with haemorrhage and diarrhoea. Loss of memory, and mortification of fingers and toes, are common complications; and there are records of impairment of the eyesight.

So far the case for identification is obviously strong; and fuller exposition of the detail would confirm it further. But (omitting minor discrepancies) there remain one or two serious obstacles:

(i) As Shrewsbury says, 'before typhus fever can even be considered, . . . we need some historical evidence, or at least a strong presumption, that the Athenians were familiar with the black rat'. It must be emphatically stated that there is no such historical evidence, and—since there are many places where a reference to the rat, if it were known, might confidently be expected—that the 'strong presumption' points decidedly in the opposite direction. Though the word *μῦς* might signify not only 'mouse' but also any other mouse-like creature, nobody has yet discovered any passage in early, classical, or Hellenistic literature where the meaning 'rat' has anything to recommend it, or any certain or even probable portrayal of the rat in Greek sculpture or painting of the pagan era. If the theory of typhus fever depends upon the existence of the rat<sup>2</sup> in Athens in the fifth century B.C., then it is a theory based on faith and hope, without (in this most important respect) a single fact in its favour. Arguments

<sup>1</sup> B. von Hagen, *op. cit.*, is the most recent pleader for smallpox. He admits, but makes no attempt to answer, the objection stated under (iii) above (he scrutinized the Naples bust of Thuc. for scars, but it *gab keinen Anhaltspunkt*). He admits further that *gangrene* is incompatible with the smallpox-theory, and suggests that this complication was introduced by a concurrent outbreak of a second plague, *typhus exanthematicus*; the same notion, that Thuc. has confused a plurality of simultaneous plagues, had already been expressed by G. Sticker, *Festschr. für B. Nocht*, 1937, p. 604 (quoted by von Hagen; I have not seen it). He does not discuss objections (i) and (ii).

<sup>2</sup> I have seen it stated that it is not quite

certain that the rat is the sole permanent reservoir of epidemic typhus, and that the body-louse (which was thought to convey from man to man an infection derived by man from the rat) may itself be the host. But then we should have to make the very improbable assumption that the Athenians had already in the spring of 430 B.C. sunk to such a state of filth that the disease might be generated and the infection universally transmitted in this way. The city had indeed for some months been crowded by the abnormal influx of residents from the country: but the Athenians were not a dirty people, and there is no other indication that a decent standard of cleanliness and sanitation was not maintained.

*ex silentio* are unsatisfactory: but theories devoid of factual foundation have no advantage in this respect.<sup>1</sup>

(ii) Mental disorders of various kinds and degrees, ranging from wild hallucination in the earlier stages to the typical coma-vigil in the later, are highly characteristic of typhus fever. Of these very striking and very common features Thucydides has nothing whatever to say. We should have to assume that although he recorded much less important and alarming matters, he thought this not worth mentioning: and it has been shown that the nature of his description sharply contradicts any such assumption. There is no suggestion that the patient did not retain his mental faculties unimpaired up to the end.

(3) *Bubonic plague*. This candidate has been examined and rejected by so many medical historians that he is not likely to present himself again. He brings no rat, and requires us to believe that Thucydides did not observe, or did not think worth recording, the features from which the Plague takes its name—the buboes, swelling of the glands, especially in the groin and armpits. One needs only to compare Procopius' account of the epidemic at Constantinople in A.D. 542 (*Persica* 2. 22), in which bubonic plague is unmistakably described, to see the absolute impossibility of reconciling Thucydides' description with this disease. The differences between the two are too great to be concealed even by Procopius, who copies so much of Thucydides' text as the circumstances allow.

Those varieties of the Plague known as pneumonic and septicaemic are, if possible, still less compatible with Thucydides' account.<sup>2</sup>

(4) *Typhoid (enteric) fever*. The onset is marked by headache, fever, sleeplessness, general distress. The cheeks are flushed, the tongue is at first covered with whitish fur but red and raw at the tip and edges. There may be much thirst, and in some cases vomiting. Physical prostration is not the rule in the earlier stages (the patient may not take to his bed for a week, and may not be prostrate until the end of the third week). Intestinal inflammation and ulceration, diarrhoea, and an eruption over the body, especially the abdomen, chest, and back (often with faint bluish patches as well as the pink or rose spots), are characteristic of this disease. Death is most commonly caused by exhaustion (*ἀσθενεῖλαι διεφθειρόντο*), by perforation of intestinal ulcers (*τῆι κοιλίαι ἐκλώσσεις ἰσχυρᾶς ἐγγυγνομένης*), or by haemorrhage from the intestines. Although dysenteric stools are common in serious cases, the characteristic stool is one which Thucydides would certainly have described as *διάρροια ἄκρατος*, not as

<sup>1</sup> There is apparently no doubt about the existence of the rat in Italy in the first century A.D. See the evidence assembled by Sir W. P. MacArthur in *Transactions of the Royal Society of Tropical Medicine and Hygiene*, xlvii, 1952, pp. 209 ff., with references on p. 212 to modern treatments of the subject. I am very much obliged to the author for sending me a copy of this paper, and also of another, *ibid.* p. 464, where it is reported that the skeleton of a rat, indistinguishable from *Rattus Rattus*, has been found by Prof. Haas in a neolithic site on Mt. Carmel, another (of unidentified species) in a palaeolithic site in the desert of Judaea. I am

indebted to Sir William also for a description (which I have been careful not to go beyond) of the symptoms of typhus fever in relation to Thuc.'s Plague. The disagreement between us on the main issue here remains unfortunately absolute; but none of my numerous correspondents has helped me nearly so much.

<sup>2</sup> B. von Hagen quotes Schröder, *Mü. Med. Wochenschr.* 1916, as a supporter of pneumonic plague. The discrepancies seem to me so numerous and large that I have not thought it worth while to pursue the matter farther here.

*δυσεντερία*. About mental disorders the modern descriptions have little or nothing to say.

This is obviously a strong candidate: but, apart from the fact that some of the lesser Thucydidean symptoms are not characteristic of typhoid, there remain one or two serious discrepancies:

(i) The abdominal pains of typhoid fever are noticeable at a much earlier stage than that described by Thucydides. In the Athenian Plague the intestinal troubles are said to have supervened in cases where the patient survived the main crisis on the 7th or 9th day: in typhoid fever, they are of the essence of the disease, and their effect may be seen and felt at a relatively early stage.

(ii) If gangrene of the extremities is associated as a complication with typhoid fever, the modern descriptions which I have seen are at fault.

(iii) Although the characteristic stool is *διάρροια ἄκρατος*, stools of blood must have been common in fatal cases, and it would have to be supposed that Thucydides either did not know this or did not think it worth recording.<sup>1</sup>

I now proceed to consider a claimant which may prove to be the best qualified of all, the one proposed by Shrewsbury: *measles*. I shall first summarize one modern description, of comparable length and scope, referring parenthetically to Thucydides' text:

'The incubation period is not accompanied by evident symptoms (*ἐξ οὐδεμιᾶς προφάσεως κτλ.*). The early stages are characterized by acute catarrh, attended by sneezing (*πταρμός*), discharge from the nose, redness and watering of the eyes (*ὀφθαλμῶν ἐρυθήματα*), a dry noisy cough (*μετὰ βήχός ἰσχυροῦ*), hoarseness (*βράγχος*), occasionally sickness (*ἀποκάθαρσις χολῆς*) and diarrhoea (*διάρροια*); other symptoms are headache and fever (*κεφαλῆς θερμαί*), rapid pulse, thirst (*δίψα*), restlessness (*ἀπορία τοῦ μὴ ἡσυχάζειν*), convulsions, as a rule in children (*σπασμὸν*); on the fourth or fifth day appears the characteristic eruption on the skin, crimson or dusky red spots covering the greater part of the body (*φλυκταίναις μικραῖς καὶ ἔλκεσιν ἐξηνηθικός*). In malignant cases the rash may be dark purple in colour

<sup>1</sup> Since this paper was written I have seen in typescript an article by Mr. P. Salway and Miss W. Dell, arguing the case for *ergotism*. I had rejected this possibility for the reasons given by Finley in his *Thucydides*, p. 158, n. 2 (compare esp. R. Kobert, *Zur Gesch. des Mutterkorns*, 1889, pp. 1 ff., with the objections of W. Ebstein, *Deutsche Med. Wochenschr.* xxxvi, 1899, pp. 594 ff.). The resemblance between the Athenian Plague and ergotism is in many respects most striking: the apparently insuperable objection was that it would be necessary to prove that rye was used in the making of food, yet we know, so surely as such things can be known, that 'rye was not used for bread in the Mediterranean region throughout antiquity' (Finley, l.c., with authorities). I learn from the above-mentioned article (due for publication soon, I hope) that this objection is not founded on fact—that *claviceps purpurea* may attack other grains (including wheat) as well as rye. There remain, how-

ever, at least two further obstacles: (1) we should have to suppose that Thuc. was mistaken in thinking that the Plague was *infectious*: a very bad blunder, if it was one; (2) delirium and similar mental disturbances are said to be characteristic of ergotism. I say no more about it at present, in the expectation that Mr. Salway and Miss Dell will throw new light on these and other points.

Sir Clifford Allbutt, *Greek Medicine in Rome*, pp. 340 f., inclines to favour *scarlatina maligna*. Again, there is much general similarity in the symptoms, but again the discrepancies are numerous and important (*sc. mal.* is normally accompanied by *prostration* and *delirium* in the early stages, and in fatal cases death normally ensues within 48 hours, or, at least, long before the 'seventh or ninth day' of Thuc.; moreover, I cannot find that gangrene is a complication of this disease. Brandeis, p. 24, absolutely rejects the possibility of this identification).

(πελιδνόν), and the patient may suffer affections of the gastro-intestinal mucous membrane (ἐλκώσεως τῆσι κοιλίαι ἐγγυνομένης), causing great prostration (ἀσθενεΐαι διεφθείροντο). Pulmonary complications are common (ἐκ τὸ στήθος κατέβαινε); and there may remain as results of the disease chronic ophthalmia (στερικκόμενοι ὀφθαλμῶν), deafness, and occasionally a form of gangrene of the tissue of the mouth, cheeks, and other parts of the body (ἀκρωτηρίων ἀντίληψις).<sup>2</sup>

The resemblance is obviously close; and it will save space, and present the picture more clearly, if I state summarily how far the Thucydidean symptoms recur in descriptions of measles in respectable modern works of reference: P = *Textbook of the Practice of Medicine*, ed. F. W. Price, 5th edn., 1937, pp. 253 ff.; C = *Textbook of Medicine*, ed. R. L. Cecil, 1935, pp. 290 ff.; R = *Acute Infectious Diseases*, J. D. Rolleston, 1925, pp. 266 ff.; B = *Black's Medical Dictionary*, 19th edn., 1948, s.v.; E = *The British Encyclopaedia*, 14th edn., s.v. (the source of the foregoing summary).

The following Thucydidean symptoms are mentioned by most or all of these authorities: Feverishness, inflammation and redness of the eyes, redness of tongue and throat; sneezing, hoarseness, coughing, vomiting, convulsions (rare except in children); the skin-eruption; thirst, restlessness, sleeplessness; diarrhoea. As complications: ulceration and other affections of the intestines; loss of eyesight; gangrene, especially *noma* of the tissue about the mouth, but also of other parts of the body, including the pudenda (Rolleston; also Osler-McCrae, *System of Medicine* s.v., quoted by Shrewsbury, p. 23). All state that the disease is highly infectious. None mentions physical prostration at an early stage, and none associates delirium or stools of blood with it. The following Thucydidean symptoms are mentioned by at least one of the five: dark purple colour of the skin during the exanthematous period (E); sensation of great internal heat (C); general distress (P) and mental depression (B); unproductive retching (C, B).

The case for identification so far is as strong as one could reasonably expect; before considering whether there is any residue of incompatibles I borrow from Shrewsbury a most interesting part of his exposition, showing that the desire to immerse the body in cold water, attested by Thucydides, has a remarkable parallel in a modern record of measles. Measles invaded the Fiji Islands for the first time in 1875; and if anyone is inclined to doubt whether a disease so relatively innocuous in a civilized society could have had the effect which Thucydides' Plague had on the Athenians, let him learn that out of a population of 100,000 about 25,000 died in a few months. Specially relevant to Thucydides' description are the following quotations from reports by the Colonial Surgeon<sup>1</sup> appointed to the Fiji Islands, by the Colonial Secretary,<sup>2</sup> and by missionaries present at the time.<sup>3</sup> Thucydides says that the unattended sick would throw themselves into cold water and into wells: now listen to the modern witnesses:

'They preferred . . . when overtaken by the fever, to crawl out of their houses and cool their bodies by lying on the damp ground or in the bed of

<sup>1</sup> B. C. Corney, *Trans. Epidem. Soc.*, London, n.s. iii, 1884, pp. 76 ff.

<sup>2</sup> J. B. Thurston, *Report to the Governor*; for this I have depended wholly on Shrewsbury.

<sup>3</sup> Esp. H. L. Layard, *Missionary Notices*, xxi, Methodist Mission House, London, 1875-7.

the nearest creek.' 'Unless watched, the men have a tendency to walk into the water by way of reducing the fever under which they suffer.' 'The natives . . . will expose themselves to cold and wet to allay the feverishness. Some actually creep away at night . . . and lie down in the sea or creeks.' 'Many of the patients have confessed to having . . . lain down in a cold running stream . . . They will try to allay the fever by lying in a mountain-stream.'<sup>1</sup>

It is not denied that there are other records of the impact of measles on an unexposed society in which no such desire for immersion is recorded; or that there are a few examples of such an impulse in diseases other than measles. The relevance of the testimony must not be misunderstood: Thucydides states that this relatively rare phenomenon was characteristic of the Athenian Plague; modern records prove that it was characteristic of the plague of measles at Fiji. Our purpose is to establish so far as possible whether the facts recorded by Thucydides contain anything uncharacteristic of, or incompatible with, measles; and the Fijian record proves that this particular feature was in fact characteristic of a plague of measles.

Finally, I try to determine whether there remain any incompatibles. The verdict of course rests with the medical men: the layman can only point to matters of apparent fact and state the questions which suggest themselves.

First, the 'abnormal and foul breath.' This symptom is not mentioned in any of the accounts which I have seen; and though the layman is aware that the breath of children in the earlier stages of measles is malodorous, the physician may (for all I know) deny that this fact has any necessary connexion with the disease in question. I cannot judge whether any, or much, importance should be attributed to this point.

Secondly, Thucydides states that the Plague 'did not, with fatal result, seize upon the same person twice': the implication might seem to be that the sufferer was not absolutely immune thereafter. There is, however, nothing in Thucydides' words here inconsistent with measles: (i) Relapse in measles is rare, but does occur (Price, *l.c.*, p. 258); Thucydides need mean no more than that he found no case of relapse with fatal outcome; (ii) the words *ὥστε καὶ κτείνεω* may be prompted by caution: Thucydides observed that the Plague did not, in general, attack the same person twice: he could not possibly know that this was universally true; but it may well have been a matter of common knowledge or belief that there was no further danger to life after the first attack. It would then be a fair statement to say that 'there was no second attack (not with fatal outcome)'. It is worth noticing that he does not put his statement in the form 'Second attacks were not fatal,' or the like; he asserts positively that 'the same person was not attacked twice', and cautiously qualifies this with the parenthesis 'not so as to be killed'.

Third, loss of memory. This is not, so far as I know, said to be characteristic of measles. But neither is it said by Thucydides to be characteristic of the Plague at Athens. It was a final complication *in some cases*, after the patient had survived both the first and the second climax: and this matter may well have been considered specially worth mentioning by reason of its rarity—a survey

<sup>1</sup> These quotations are directly borrowed from Shrewsbury's article, though I have been able through the kindness of Dr. Williamson to read in full the sources of most.

of the Hippocratic Corpus shows that loss of memory was very seldom recorded by the early Greek doctors in any connexion. It should be noticed that there is no suggestion in Thucydides that the condition lasted for any length of time.

Fourthly, mortification of the 'extremities', ἀκρωτήρια, of the body. Whereas a form of gangrene of the tissue, especially of the mouth, cheeks, and pudenda, is well attested as a complication of measles (Osler, Rolleston, Price, ll.cc., and others), I have not seen it stated that it ever attacks the toes and fingers; and it has been suggested to me that the *noma* in question is of a type which would not be expected to affect those parts. Whether this is so, and whether, if it is so, it is a serious obstacle to the identification with measles, are questions on which I seek further enlightenment.<sup>1</sup>

I conclude by repeating that the similarity between Thucydides' description of the Plague and an average modern description of measles is, as a simple matter of fact, close. Unless the modern accounts are misleading to the layman, or otherwise unreliable, there is probably a better case for the identification with measles than with any other disease.<sup>2</sup>

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<sup>1</sup> I should add, fifthly, a question raised and answered by Dr. W. H. S. Jones: if the Plague was measles, it should have become endemic; yet there is no later reference to measles in Greek (or Roman) medical (or other) writers. The strength of this negative argument is broken by the parallel example of *mumps*, described at Thasos in the fifth century B.C. but ignored by all subsequent Greek medical writers (though there may be a reference in Celsus).

<sup>2</sup> The foregoing is a revised version of a paper read to the Philological Society at

Cambridge and to the Classical Association at Oxford in 1952. I have done my best to improve it in the light of the considerable correspondence which followed those occasions. Medical opinions, in which of course I was most interested, were fairly evenly divided for and against. The measure of agreement was such as to encourage me, perhaps against my better judgement, to publish this; the expressions of disagreement were such as to lead me to expect no mercy for having done so.