SCIENCE AND PSEUDO-SCIENCE IN

POE'S WORKS

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PREFACE

So far as I have been able to determine, there has been published no survey of Poe's use of science and pseudo-science. Numerous writers have interpreted individual stories and poems and the poet's life, but few have made any attempt to list those subjects in the field of science in which Poe had an interest. This study attempts to list these subjects, and, when possible, to determine in what way Poe used each division of scientific knowledge. These lists, I believe, are practically complete for all of Poe's work that has been available to me; the degree of completeness depends of course upon the degree of completeness of the present editions of Poe's works. I have used the Virginia edition, edited by James A. Harrison, and a collection of Poe's contributions to the Columbia Spy, edited by Jacob E. Spannuth and Thomas Ollive Mabbott under the title Doings of Gotham. That everything Poe wrote is not at the present time collected and available is an acknowledged fact. It is improbable, however, that anything of his that is yet undiscovered would alter materially the results of this investigation.

I have made few attempts in this paper to determine the accuracy of Poe's use of various items of knowledge which I have classified as science and pseudo-science. On only two subjects was it possible to establish with any degree of certainty the extent or quality of Poe's knowledge.

These two, cryptography and phrenology, have been settled with a fair degree of definiteness. I have been able to establish the truth or falsity of very little of the mathematical and astronomical material in Poe's essay Eureka. The opinions of those who have discussed this longest of Poe's pseudo-scientific essays have been carefully considered; it is apparent that much remains to be done in interpreting this work.

For the purposes of this study I have divided the field of science into the following heads: medicine, chemistry, biology, navigation, meteorology, astronomy, physics, mathematics, and invention. I have classified as pseudo-sciences the following subjects: psychology, metaphysics, phrenology, astrology, galvanism, mesmerism, logic reasoning, cryptography, and graphology. The basis for such classification, with the exception of phrenology and psychology, is Poe's use of these subjects and their status in the first half of the nineteenth century. I have classified phrenology as a pseudo-science because it does not have the status of a science at the present time. In the nineteenth century phrenology was generally recognized as a branch of science; psychology, which is today recognized as a science, was not at that time regarded as a field of scientific investigation. I have considered it best to make this division because Poe's treatment of psychology is not scientific, and the claims of phrenology have been disproved by investigation. I have

classified cryptography as a pseudo-science because Poe's treatment of the subject does not go beyond the limits of superficial investigation.

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CHAPTER I

MEDICINE AND CHEMISTRY

Medicine

Poe's interest in certain diseases and their symptoms is greater than the casual reader might suspect. In his prose works there is evidence of interest in at least five, and probably more, separate human ailments. "In four of his stories," says Campbell, "he capitalized the interest of his time in the cholera, which ravaged the Atlantic Coast cities in 1832."[1] These four stories seem to be "King Pest," "Shadow," "The Masque of the Red Death," and "The Sphinx." The diseases in these stories are not all identifiable as cholera. Epilepsy, which might be considered a form of catalepsy,[2] is apparent in three of the tales, "Berenice," "The Premature Burial," and possibly "The Fall of the House of Usher." In "The System of Dr. Tarr and Prof. Fether" Poe speaks, in a somewhat jesting manner, of insanity and its cure; in a critical sketch he mentions the symptoms of typhoid fever. He gives brief notice in various places, which will be enumerated later, to gynecology, false limbs, blood-letting, nutrition, and the common medical practices of the

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[1] Killis Campbell, Editor, Poe's Short Stories, New York, Harcourt, Brace and Company, 1927, "Introduction," p. xviii; see also Killis Campbell, The Mind of Poe and Other Studies, Cambridge, Massachusetts, Harvard University Press, 1933, p. 104.

[2] "Catalepsy," Encyclopaedia Britannica, Fourteenth Edition, Vol. V, p. 18.

day.

In "King Pest" six horrible people are assembled in an undertaker's parlor. Each of these individuals shows signs of some ailment in advanced stages. The descriptions given in the story indicate that one is a victim of consumption, one of paralysis, two of what probably is delirium tremens, one of the gout, and one of aggravated dropsy.[3]

The tale "Shadow, A Parable" merely mentions that a pestilence is abroad in the land. There does not seem to be any way of determining exactly what disease has devastated the land. "The Masque of the Red Death" furnishes a vivid description of a disease whose aspects are truly terrible. The opening paragraph of the story furnishes this example:

> The Red Death had long devastated the country. No pestilence had ever been so fatal, or so hideous. Blood was its Avatar and its seal--the redness and the horror of blood. There were sharp pains, and sudden dizziness, and then profuse bleeding at the pores, with dissolution. The scarlet stains upon the body, and especially upon the face of the victim, were the pest ban which shut him out from the aid and from the sympathy of his fellowmen. And the whole seizure, progress and termination of the disease, were the incidents of half an hour.[4]

It may be that this description is the product of Poe's imagination; the symptoms given are those of a disease which

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[3]James A. Harrison, Editor, Complete Works of Edgar Allan Poe, New York, Fred de Fau and Co., 1902, Volume II, pp. 174-177. (Unless otherwise indicated, all further references to Poe's works will be made to this edition, which will be designated as Works.)

[4]Works, Vol. IV, p. 250. This does not seem to be the cholera. See "Cholera," Encyclopaedia Britannica, Vol. V, p. 616.

it has been impossible to identify. In the last story of this group which capitalized the cholera epidemic, Poe merely refers specifically to the "dread reign of the cholera in New York."[5] He makes no effort to delineate the effects of cholera as he does of the unknown disease in "The Masque of the Red Death."

Poe's treatment of epilepsy in the stories "Berenice" and "The Premature Burial" is perhaps a better consideration of the effects of the disease than is his discussion of the strange disease in "The Masque of the Red Death." In the first of these stories he describes the qualities of the illness with startling reality:

> Among the numerous train of maladies superinduced by that fatal and primary one which effected a revolution of so horrible a kind in the moral and physical being of my cousin, may be mentioned as the most distressing and obstinate in its nature, a species of epilepsy not unfrequently terminating in trance itself--trance very nearly resembling positive dissolution, and from which her manner of recovery was, in most instances, startlingly abrupt.[6]

The story "The Premature Burial" sets forth the belief that life is separated from death by only the slightest of boundaries, and states with apparent certainty:

> We know that there are diseases in which occur total cessations of all the apparent functions of vitality, and yet in which these cessations are merely suspensions, properly so called. They are only temporary pauses in the incomprehensible mechanism. A certain period elapses, and some unseen mysterious principle sets in motion the magic pinions and the wizard wheels.[7]

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[5]"The Sphinx," Works, Vol. VI, p. 238.

[6]Works, Vol. II, pp. 18-19. [7]Works, Vol. V, p. 256.

It may be that Poe had no genuine interest in the disease of epilepsy, and that he used it in these stories because the effects of the disease so closely resemble death.

"The Fall of the House of Usher" gives the third example of Poe's references to this subject. In this tale the disease becomes a part of the mysterious influence that pervades the House of Usher.

> The disease of the lady Madeline had long baffled the skill of her physicians. A settled apathy, a gradual wasting away of the person, and frequent although transient affections of a partially cataleptical character, were the unusual diagnosis. Hitherto she had steadily borne up against the pressure of her malady, and had not betaken herself finally to bed . . .[8]

That Poe made use of those things which seemed to suit his definite needs in writing a particular story appears to be true in so far as his use of medical ideas is concerned. In the supposedly humorous tale "The System of Dr. Tarr and Prof. Fether," based on the antics of the inmates of an asylum near Paris, Poe evolves a theory as to the treatment of insanity. The unusual system, possibly not original with Poe, is that used by Monsieur Maillard in his private sanitarium.

> I may state the system, then, in general terms, as one in which the patients were menages, humored. We contradicted no fancies which entered the brains of the mad. On the contrary, we not only indulged but encouraged them; and many of our most permanent cures have been thus affected. There is no argument which so touches the feeble reason of the madman as the argumentum ad absurdum.[9]

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[8] Works, Vol. III, pp. 281-282.

[9] Works, Vol. VI, p. 57.

Medical terminology seemingly more genuine than the somewhat ridiculous discussion of insanity appears in a criticism of a work called The Importance of Physical Signs in Various Diseases of the Abdomen and Thorax. Poe states that "Dr. H. advocates no theory in especial, but in regard to typhus fever agrees with M. Louis in supposing the true lesion of the disease to reside in an organic alteration of the glands of Peyer."[10] In the same review Poe discusses briefly the value of external signs in diagnosing diseases, and gives the selection a scientific air with the statement, "The brain is not treated of--for, except in a few strictly surgical instances, the unyielding parietes of the brain will admit of no diagnosis deduced from their examination."[11]

In a later criticism, a review of Dickens' Barnaby Rudge, Poe shows that he has a definite idea of the state of the science of gynecology at that time. Concerning a character in the novel, Poe says, "The stain upon Barnaby's wrist, caused by fright in the mother at so late a period of gestation as one day before mature parturition, is shockingly at war with all medical knowledge."[12]

In still another humorous story, "The Man That Was Used Up," there is indirect mention of medical practices. Though the language employed is not so scientific in nature--indeed it is doubtful that Poe intended the tale to be scientific--

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[10] Works, Vol. IX, p. 166. [11] Ibid. p., 165.

[12] Works, Vol. XI, p. 59.

there exists what amounts to a statement of the advanced stage of the use of artificial limbs. Carried to an absurd extreme, the device stretches the imagination of even the person of the twentieth century, who is somewhat accustomed to the marvels of modern medical science in this direction.

Medical practices of the time, perhaps familiar to most laymen of the nineteenth century, receive some attention in the pseudo-scientific tale "The Unparalleled Adventure of Hans Pfaall" and in the "Marginalia." In the former instance, the narrator experiences great dizziness at the high altitude he attains on the way to the moon. "I lay down in the bottom of the car, and endeavored to collect my faculties. In this I so far succeeded as to determine upon the experiment of losing blood."[13] The hero of the tale succeeds in opening a vein in his arm, which gives him almost immediate relief from the fit of dizziness.

In "Marginalia" Poe mentions the common medical practices of the day and comments briefly on the nutritive values of certain foods. Evidently the doctors of the time did not have a very firm belief in the efficacy of painless and pleasant remedies, for the record left here states quite definitely that "the drugging system, in medical practice, seems to me to be a modification of the idea of penance, which has haunted the world since its infancy--the idea

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[13]Works, Vol. II, p. 71.

that the voluntary endurance of pain is atonement for sin."[14] Further in the same paragraph occurs the statement and question: ". . . in sickness, remedies were selected in the ratio of their repulsiveness. How else shall we account for the fact, that in ninety-nine cases out of a hundred, the articles of Materia Medica are distasteful?"[15] Probably without any definite idea of scientific knowledge, Poe makes the following observation concerning nutrition: "In polar climates, the human frame, to maintain its due caloric, requires, for combustion in the stomach, the most highly ammoniac food, such as train oil."[16] These instances apparently bear out the idea that Poe was interested in various branches of medicine, though he had probably little genuine knowledge of the subject. What knowledge he had was scattering and random rather than definite and specific. It was probably gathered from his occasional reading of historical and medical journals.[17]

Chemistry

The use which Poe made of various chemical ideas is apparently similar to that made of the medical knowledge that he gleaned from his wide reading. In his stories he refers no less than five times to gases and their properties.

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[14] *Works*, Vol. XVI, p. 93. [15] *Ibid*. [16] *Ibid*., p. 9.

[17] David Lee Clark, "The Sources of Poe's 'The Pit and the Pendulum,'" *Modern Language Notes*, Vol. XLIV (June, 1929), pp. 349-356, gives this impression.

Bichloride of mercury, and its effect on animal matter and wood, is mentioned three times in all. To the base of most popular soda waters of the twentieth century, carbonic acid gas, Poe refers one time briefly. He makes use of the terms of a chemical mixture at least one time. One skillful investigator has made this statement concerning Poe's chemical knowledge: "He knew something . . . about chemistry, though so far as I can learn he at no time had any set instruction in the subject."[18]

Probably the most interesting reference that Poe makes to a gas is found in "The Unparalleled Adventure of Hans Pfaall," in connection with the inflation of the balloon used by the intrepid adventurer in his flight. Possibly the author is serious when he makes this claim:

> The gas to be formed . . . is a gas never yet generated by any other person than myself--or at least never applied to any similar purpose. I can only venture to say here, that it is a constituent of azote [the word used to designate nitrogen in the nineteenth century][19] so long considered irreducible, and that its density is 37.4 times less than that of hydrogen. It is tasteless, but not odorless, burns, when pure, with a greenish flame, and is instantly fatal to animal life.[20]

To the layman, this description of the gas used by Hans has

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[18]Killis Campbell, The Mind of Poe and Other Studies, p. 18.

[19]See Sir Humphrey Davy, Elements of Chemical Philosophy, London, printed for J. Johnston and Col, St. Paul's Church Yard, 1812, pp. 255-270.

[20]Works, Vol. II, p. 52. This story will be treated in more detail under Chapter III.

all the marks of a genuine scientific paragraph setting forth the chemical properties of a gas, but it is probably true that the gas is set forth so minutely to add to the atmosphere of the story and is the product of Poe's imagination.

"The Conversation of Eiros and Charmion," the basis of which seems to be a scientific experiment,[21] gives Poe's belief concerning the chemical constituents of the air. "It had long been known that the air which encircled us was a compound of oxygen and nitrogen gases, in the proportion of twenty-one measures of oxygen, and seventy-nine of nitrogen, in every one hundred of the atmosphere."[22] This seems to give a plausible turn to the story, and it may have been correct from the standpoint of the average reader in the time of Poe. That the air is not a compound but a mixture is well known to most freshman college students of the twentieth century. Failure on Poe's part to make a distinction between a chemical compound and a chemical mixture may be another indication that he had no definite instruction in the field of chemistry, yet he did know the general properties of the two gases he mentions in this story. After giving the elements of the air, he goes on to give in detail the properties of each of the elements.

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[21] Margaret Alterton, The Origins of Poe's Critical Theory, Iowa City, Iowa, University of Iowa Press, 1925, p. 140.

[22] Works, Vol. IV, p. 7.

> Oxygen, which was the principle of combustion, and the vehicle of heat, was absolutely necessary to the support of animal life, and was the most powerful and energetic agent in nature. Nitrogen, on the contrary, was incapable of supporting either animal life or flame. An unnatural excess of oxygen would result, it had been ascertained, in just such an elevation of the animal spirits as we had latterly experienced.[23]

Though there is found no detailed account of the properties of the respective gases, there is present in each of the stories "Mellonta Tauta" and "The Balloon-Hoax" a reference to a lighter than air gas used, as in "The Unparalleled Adventure"of Hans Pfaall," for the inflation of a balloon for travel. In the first of these stories, an imaginative account of the wonders of life in the twenty-ninth century, the mention is very slight: "The new gas is doing wonders, in connection with the new improvement with gutta percha."[24] The account in the latter of these two selections is somewhat more detailed, and seems to fall more in line with the attitude expressed in the preceding reference to a gas suitable for a balloon. In "The Balloon Hoax" Poe discusses with seeming scientific exactitude the relative values of coal gas and hydrogen. It is necessary to quote at length to see the viewpoint taken.

> The balloon is of vast dimensions, containing more than 40000 cubic feet of gas; but as coal gas was employed in place of the more expensive and inconvenient hydrogen, the supporting power of the machine, when fully inflated, and immediately after inflation, is not more than about 2500 pounds. The coal gas is not only much less costly, but is easily procured and managed.

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[23] Ibid. [24] Works, Vol. VI, p. 206.

> For its introduction into common use for purposes of aerostation, we are indebted to Mr. Charles Green. Up to his discovery, the process of inflation was not only exceedingly expensive, but uncertain. Two, and even three days, have frequently been wasted in futile attempts to secure a sufficiency of hydrogen to fill a balloon, from which it had great tendency to escape owing to its extreme subtlety, and its affinity for the surrounding atmosphere.[25]

Without consideration of the authenticity of the statements, one can detect a certain attempt to assume the scientific attitude that is a direct echo of the effort in the story "The Unparalleled Adventure of Hans Pfaall" to give the chemical properties of the gas used by following definite scientific standards. It is worth noting that this last passage gives no account of the respective characteristics of the gases under consideration; the scientific air here is attained by setting forth the relative lifting powers of the two gases.

It may be pointed out at this place that the references to gases so far discussed have, with one possible exception, all been to oxygen, nitrogen, hydrogen, or a compound of one of these. The last story in which we may find a mention of a gas is the apparent hoax "Von Kempelen and His Discovery." Poe asserts that Sir Humphrey Davy never intended his "Diary" for publication, and to prove this statement he quotes a passage from Davy's work:

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[25] Works, Vol. V, pp. 229-230.

> At page 13, for example, near the middle, we read, in reference to his researches about the protoxide of azote: "In less than half a minute the respiration being continued, diminished gradually and were succeeded by analogous to gentle pressure on all the muscles." That the respiration was not "diminished," is not only clear by the subsequent context, but by the use of the plural "were." The sentence, no doubt, was thus intended: "In less than half a minute, the respiration being continued, these feelings diminished gradually, and were succeeded by a sensation analogous to gentle pressure on all the muscles."[26]

Poe's revision of the sentence seems to be a reproduction of a passage in the collected works of Davy, which Poe must have read at some time. The passage from Davy is as follows:

> Having previously closed my nostrils and exhausted my lungs, I breathed four quarts of nitrous oxide from and into a silk bag. The first feelings were similar to those produced in the last experiment; but in less than half a minute, the respiration being continued, they diminished gradually, and were succeeded by a sensation analogous to gentle pressure on all the muscles . . .[27]

In addition to the interest in gases, Poe shows some attention to the chemical, bichloride of mercury. He seems to know the true chemical value of this compound better than he knows the gases to which he refers. In the detective story "The Mystery of Marie Roget" Poe comments on the fact that animal bodies may be preserved by the action of this chemical. "There are chemical infusions by which the animal frame can be preserved forever from corruption; the Bichloride of Mercury is one."[28] In other places he notes

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[26] Works, Vol. VI, p. 247.

[27] Collected Works of Sir Humphrey Davy, Edited by John Davy, Nine Volumes, London, Smith, Elder, and Co., Cornhill, 1839, Vol. III, p. 272.

[28] Works, Vol. V, p. 27.

the power of this mercuric salt in hardening and preserving wood. The essay "Street Paving" gives the formula for the mixture used in preparing wood blocks for paving purposes:

> Let a pound of the sublimate be dissolved in fifteen or sixteen gallons of water, and a piece of wood (not decayed) be immersed in the solution and the wood cannot afterwards be rotted. An instantaneous mineralization can be effected, if necessary, by injection of the fluid in vacuo into the pores of the wood. It is rendered much heavier, and more brittle by the process, and has altogether a slightly metallic character.[29]

It is of value to note that Poe here gives two systems that may be followed in the preparation of the wood, and that he substitutes the word "sublimate" for "bi-chloride of mercury."

The story "The Gold-Bug" gives another instance of this use of mercury. The chest containing the jewels and gold has been treated in some way. It is described as being "an oblong chest of wood, which, from its perfect preservation, and wonderful hardness, had plainly been subjected to some mineralizing process--perhaps that of the Bi-chloride of Mercury."[30] In a letter which appeared in the Columbia Spy, there is the third instance of Poe's use of this chemical term. Again it is in connection with the preservation of wood. He says, "The Kyanizing, or mineralizing, is a simple process, and cheap . . ."[31] Here Poe calls the process by the term "kyanizing," which he rejects emphatically in the essay

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[29]Ibid., Vol. XIV, pp. 167-168.

[30]Ibid., Vol. V, p. 119. Killis Campbell, The Mind of Poe and Other Studies, p. 19, has noted this example.

[31]Jacob E. Spannuth and Thomas Ollive Mabbott, Editors, Doings of Gotham, by Edgar Allan Poe, Poe's Contributions to the Columbia Spy, Pottsville, Pennsylvania, Printed by Jacob E. Spannuth, 1929, p. 62.

"Street Paving": "It is demonstrated that by the process very improperly called Kyanizing (since Kyan had not the slightest claim to the invention) even the greenest wood may be preserved . . ."[32] It is possible that this distinction, if correct, may indicate that Poe studied the subject from time to time.

Poe mentions carbonic acid gas, the basis of modern soda water, in a review of "A Pleasant Peregrination Through the Prettiest Parts of Pennsylvania." He observes that the gas must be added to the water obtained from certain springs before the water can be used medicinally.[33]

In a footnote on "N. P. Willis" in "The Literati of New York City," speaking of imagination and its relation to beauty, Poe makes this pbservation: "But, as often analogously happens in physical chemistry, so not infrequently does it occur in this chemistry of the intellect, that the admixture of two elements will result in a something that shall have nothing of the quality of one of them--or even nothing of the qualities of either."[34] This is only another slight evidence that Poe, while having little real knowledge of the science of chemistry, liked to use the terms and figures of the science.

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[32]Works, Vol. XIV, p. 167. [33]Works, Vol. XI, pp. 40-41.
[34]Works, Vol. XV, pp. 13-14.

CHAPTER II

BIOLOGY

There existed in the field of natural history definite helps to Poe in the composition of his stories. Animals, some of them possibly the invention of the author, roam through the pages of his longest story, the "Narrative of A. Gordon Pym." This long narrative, written first in serial form,[1] is a somewhat imaginative account of a journey to the regions of the polar seas. The first animal that one meets in this story is the large Gallipagos turtle, which is described in great detail:

> It is found principally, as most of my readers may know, in the group of islands called the Gallipagos, which, indeed, derive their name from the animal--the Spanish word Gallipago meaning a fresh-water terrapin. From the peculiarity of their shape and action they have sometimes been called the elephant tortoise. They are frequently found of an enormous size. I have myself seen several which would weigh from twelve to fifteen hundred pounds, although I do not remember that any navigator speaks of having seen them weighing more than eight hundred. Their appearance is singular, and even disgusting. Their steps are very slow, measured, and heavy, their bodies being carried about a foot from the ground. Their neck is long, and exceedingly slender; from eighteen inches to two feet is a very common length, and I killed one, where the distance from the shoulder to the extremity of the head was no less than three feet ten inches.[2]

Though this description is not made from the scientific

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[1] Kenneth Rede, "Poe Notes," American Literature, Vol. V (Mar., 1933), p. 49.

[2] Works, Vol. III, p. 132.

point of view, it illustrates well the manner in which Poe attempts to give an air of genuineness to the tale. The turtle depicted above would make an excellent specimen for a biologist to examine. Poe adds a description of the diet of the turtle, its habits, and its general mode of life.

When the travellers in the "Narrative of A. Gordon Pym" reach the place called Kerguelen's Island, the author takes time to observe the seals and sea elephants. "Some seal of the fur and hair species are still to be found on Kerguelen's Island, and sea elephants abound."[3] In the vicinity of Nightingale Island, farther south in the Atlantic, the author notices ". . . sea lions, sea elephants, the hair and fur seal . . . ."[4] About a week later the adventurers pick from the sea a strange animal, which the eye of man has probably never seen before:

> It was three feet in length, and but six inches in height, with four very short legs, the feet armed with long claws of a brilliant scarlet, and resembling coral in substance. The body was covered with a straight silky hair, perfectly white. The tail was peaked like that of a rat, and about a foot and a half long. The head resembled a cat's, with the exception of the ears--these were flapped like the ears of a dog. The teeth were of the same brilliant scarlet as the claws.[5]

Again Poe's description is one which a naturalist might use in telling a layman of a new animal just discovered.

In a second travel narrative, "The Journal of Julius

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[3] Ibid., p. 153.

[4] Ibid., p. 160.

[5] Works, Vol. III, pp. 179-180.

Rodman, Being an Account of the First Passage across the Rocky Mountains Ever Achieved by Civilised Man," Poe finds occasion to list animals that the hunters in the party bring into camp. "The hunters came into camp, at night, from both sides of the river, and brought us more game than we well knew what to do with--grouse, turkies, two deer, and antelope. . . ."[6] Further in the same selection there occurs a rather detailed account of the beavers and their habits. Poe seemingly had some definite information concerning these animals, for his discussion of their manner of work and their characteristics seems to be more genuine than most of his animal descriptions.[7]

The only other example of an animal whose characteristics are given is the ourang-outang of the detective story "The Murders in the Rue Morgue." This account, taken, according to Poe, from Cuvier, has been noted by at least one other investigator, who maintains that the real ape is much less ferocious than Poe's, and that Poe uses the idea for literary effect.[8] It will be of value to quote the full

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[6]Works, Vol. IV, p. 43.

[7]Killis Campbell, "Three Notes on Poe," American Literature, Vol. IV (Jan., 1933), p. 388, says that Poe took many sections of the "Journal" from Irving's Astoria. See also Polly Pearl Crawford, "Lewis and Clark's Expedition as a Source for Poe's 'Journal of Julius Rodman'," University of Texas Studies in English, No. 12, July 8, 1932, pp. 158-170, who shows that many passages were taken by Poe from the book by Lewis and Clark.

[8]John Robert Moore, "Poe, Scott, and 'The Murders in the Rue Morgue'," American Literature, Vol. VIII (Mar., 1936), p. 54.

paragraph relative to the animal as described by Cuvier:

> It was a minute anatomical and generally descriptive account of the large fulvous Ourang-Outang of the East Indian Islands. The gigantic stature, the prodigious strength and activity, the wild ferocity, and the imitative propensities of these mammalia are sufficiently well known to all.[9]

If it be true that the real beast is less fierce than the one brought forth by Dupin in the story, then one might conclude that Poe is merely using the pseudo-scientific description to fit the needs of the narrative.

In some of his tales Poe makes use of birds as well as animals. He describes in some detail the royal penguin found on Kerguelen's Island by the travellers in the "Narrative of A. Gordon Pym." One might think that Poe really saw the bird before he related its characteristics in this story:

> The upper part of the body is usually gray, sometimes of a lilac tint; the under portion of the purest white imaginable. The head is of a glossy and most brilliant black, the feet also. The chief beauty of the plumage, however, consists in two broad stripes of a gold colour, which pass along from the head to the breast. The bill is long, and either pink or bright scarlet. These birds walk erect, with a stately carriage.[10]

In addition to the penguin, Poe lists "seahens, blue petrels, teal, ducks, Port Egmont hens, shags, Cape pigeons, the nelly, sea-swallows, terns, sea-gulls, Mother Carey's chickens, Mother Carey's geese, or the great petrel, and,

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[9] Works, Vol. IV, p. 182.

[10] Works, Vol, III, pp. 153-154.

lastly, the albatross."[11] He goes on to give the peculiarities of the great petrel and the albatross, which he maintains is a great friend of the penguin.

If Poe wrote this story because of the popular interest at that time in voyages of exploration and discovery, as at least one authority has indicated,[12] then no very great importance from a scientific standpoint can be attached to the listing of birds and animals in the selection. Possibly these numberous examples are only the author's means of adding local color to the narrative. The same thing might be true of the notice taken of pigeons in the imaginative story "The Thousand-and-Second Tale of Scheherazade." In one of the many footnotes in the story occurs this passage: "He observed a flock of pigeons passing betwixt Frankfort and the Indiana territory, one mile at least in breadth; it took up four hours in passing; which, at the rate of one mile per minute, gives a length of 240 miles; and, supposing three pigeons to each square yard, gives 2,230,272,000 pigeons. '_Travels in Canada and the United States_,' by _Lieut. F. Hall_."[13]

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[11] _Ibid._, p. 154. See Killis Campbell, _The Mind of Poe and Other Studies_, p. 21, for a comment on this passage.

[12] George E. Woodberry, _The Life of Edgar Allan Poe, Personal and Literary_, New York, Houghton, Mifflin Co., 1909, Vol. I, pp. 190-193.

[13] _Works_, Vol VI, p. 95.

In this same tale may be found several references to plants and trees. In one place Scheherazade relates to the king that a wonderful forest was discovered, the trees in which were so hard that they resisted all efforts to cut them down.[14] Again Poe substantiates the marvel with a footnote about a petrified forest in Texas, which "consists of several hundred trees, in an erect position, all turned to stone. Some trees, now growing, are partly petrified."[15] On the same page he relates an account of a large petrified forest near Cairo, Egypt. Another wonder given is the forest which stayed green under water for several months. This occurred, according to Poe, "in the year 1790, in the Carccas."[16] Smaller plants receive some attention in the tale. These are of such an unusual nature that they subsist on air, other plants, and living animals.[17] By quoting scientific names in the footnotes on these ideas, Poe gives to the account a distinct scientific air. One of these footnotes is as follows: "The Epidendron, Flos Aeris, of the family of the Orchideae, grows with merely the surface of its roots attached to a tree or other object, from which it derives no nutriment--subsisting

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[14] Ibid., p. 88-89 [15] Ibid., p. 89.

[16] Ibid., p. 91 [17] Ibid., p. 92.

altogether upon air."[18]

In at least two other places Poe mentions trees. A reference in his "Marginalia" gives the characteristics of the weeping willow, which, he says, "has a vast insensible perspiration, which, upon sudden cold, condenses, and sometimes is precipitated in a shower."[19] Attention is paid to another tree, this one a great monarch of the forest, in the selection "The Elk." Poe speaks of the banks of the river being "crowned . . . with some of the most magnificent forest trees in America, among which stands conspicuous the liriodendron tulipiferum."[20] Though there may be others, only one notice of flowers has been found. A criticism of "Flora and Thalia; or Gems of Flowers and Poetry" contains a comment by Poe on the botanical part of the book. "The Botanical description of the various parts of a flower," he writes, "is well conceived--brief, properly arranged, and sufficiently comprehensive."[21] There follows a quotation from the book concerning the qualities of different flowers.

Though it may not be so important as the references

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[18] Ibid. Poe's use of these scientific terms has been noted by Killis Campbell, The Mind of Poe and Other Studies, p. 19. Poe's Epidendron is probably one of the epidendric orchids. See "Epidendric," A New English Dictionary on Historical Principles, Edited by James A. H. Murray, Oxford, The Clarendon Press, 1897, Vol. III, Part II, p. 240.

[19] Works, Vol. XVI, p. 31. [20] Ibid., Vol. V, p. 160.

[21] Ibid., Vol. IX, pp. 43-44.

to animals, birds, and plants, the notice that Poe pays to insects is well worth brief consideration. The story "The Thousand-and-Second Tale of Scheherazade" contains a description of "monstrous animals with horns resembling scythes upon their heads."[22] This is, Poe explains in a footnote, "the Myrmeleon--lion ant," the cavern of which is "vast in comparison with the hole of the common red ant."[23] In the same section of the story there is a more detailed portrayal of a peculiar insect that "is found growing at the foot of the Rata tree."[24] The same page gives a relation of a plant that carries on pollination by the aid of an insect that nature has furnished for that particular task. This help is "that of the Tipula Pennicornis, a small insect."[25] Further discussion sets forth that this creature enters the plant, becomes swollen with pollen, and is subsequently unable to leave the plant until the stigma receives much of the pollen.

In two of Poe's stories an insect is a main element. In "The Sphinx" the narrator believes that he sees a dragon outside the window of a house, and quotes with apparent scientific exactness from a book on Natural History. The insect that caused the illusion is said to be "of the genus Sphinx, of the family Crepuscularia, of the order Lepidoptera, of the class of Insecta or insects."[26] Following

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[22] Ibid., Vol. VI, p. 92. [23] Ibid., [24] Ibid., p. 93.
[25] Ibid. [26] Ibid., Vol. VI, p. 243.

this classification, Poe gives the characteristics of this peculiar member of the insect class. Of all the descriptions of animals, birds, insects, and plants, this probably is the one that is nearest actual completeness. For this reason I give the entire account:

> "Four membraneous wings covered with little colored scales of a metallic appearance; mouth forming a rolled proboscis, produced by an elongation of the jaws, upon the sides of which are found the rudiments of mandibles and downy palpi; the inferior wings retained to the superior by a stiff hair; antennae in the form of an elongated club, prismatic; abdomen pointed. The Death's-headed Sphinx has occasioned much terror among the vulgar, at times, by the melancholy kind of cry which it utters, and the insignia of death which it wears upon its corslet.[27]

Poe speaks in at least one other place of a particular insect with the peculiar death's-head appearance. "The Gold-Bug" relates how a singular beetle leads to the discovery of a great pirate fortune. One of Poe's many biographers holds that Poe combined two real beetles into one insect, adding from his imagination some details of the description that were needed to complete the idea of the story.[28] If this be true, then Poe in at least one example uses an actually existing insect as a basis of his description.

Though it is as insignificant as any idea in the whole

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[27] Works, Vol. VI, p. 243.

[28] Hervey Allen, Israfel, New York, George H. Doran Co., Vol. I, pp. 214-218.

story, it is worth remarking that Poe uses one other item that could be classified biologically. In "The Thousand-and-Second Tale of Scheherazade," which has furnished so many examples of Poe's use of biology, there is a reference to "the Entozoa, or intestinal worms," which operate "in the muscles, and in the cerebral substance of man."[29]

As a writer attempting to use scientific ideas, Poe has received more condemnation for his treatment of mollusks than any other one thing. A publication called The Conchologist's First Book has aroused this criticism; two rather obscure references in the tales to mollusks has received little attention. The long story "Narrative of A. Gordon Pym" contains a seemingly complete discussion of a peculiar food eaten by the natives of the islands visited by Pym and his companions. Called beche de mer by the natives and seamen, who prepare it by a drying process, this delicacy seems to be set forth with scientific accuracy. Quoting from "a modern history of a voyage to the South Seas," Poe gives an interesting account, of which the following is a good example:

> "It is that mollusca from the Indian Seas which is known in commerce by the French name bouche (sic) de mer (a nice morsel from the sea). If I am not much mistaken, the celebrated Cuvier calls it gasteropoda pulmonifera. . . . They have no shell, no legs, nor

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[29]Works, Vol. VI, p. 96.

> any prominent part, except an absorbing and an excretory, opposite organs; but, by their elastic wings, like caterpillars or worms, they creep in shallow waters, in which, when low, they can be seen by a kind of swallow, the sharp bill of which, inserted in the soft animal, draws a gummy and filamentous substance . . .[30]

Following the above account, there is a narration of the size, habits, and diet of these molluska. Poe sets forth the process by which sailors and traders prepare the animal for commercial purposes. As is true of many of the descriptions in the "Narrative of A. Gordon Pym," this particular one is, so far as appearances go, truly scientific in nature.

When criticizing a book called "Zinzendorff, and Other Poems, By Mrs. L. H. Sogourney," Poe takes occasion to quote a fact which, he says, is "familiar to Conchologists." This is the rather unusual property of the genus Pholas that enables it to give a phosphorescent glow from its body.[31] Though the quotation is introduced to illustrate a point in the criticism of the poems, it is significant because it is another example of Poe's interest in the science of malacology.

While it might not receive consideration as a genuine textbook in biology, the book published under the title

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[30] Ibid., Vol. III, p. 197. [31] Ibid., Vol. VIII, p. 132.

The Conchologist's First Book[32] is of some importance in a study of Poe's use of science. Among the charges that have been made against this book are the numerous complaints that it is simply a reprint of a book written before Poe issued his.[33] Whether Poe was the real author is not of great importance; it seems to be generally accepted that he did have some hand in the composition. It also seems reasonably certain that the "Preface" and the "Introduction" were written by Poe. The most charitable view is that Poe, after writing these two parts of the book, allowed it to be published over his name as a favor to the author, whom he may have helped in the compilation of the material.[34] The "Preface" contains a history of the term "malacology," and sets forth the purpose of the book;[35] the "Introduction" has in it a survey of the field of "Conchology" and its relation to the study of the crustaceans.[36] Poe considers

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[32]The title page of the second edition of this book reads as follows: THE|CONCHOLOGIST'S FIRST BOOK:| A|System| of| Testaceous Malacology,|Arranged expressly for the use of Schools|in which|The Animals, According to Cuvier, Are Given With the Shells,| a Great Number of New Species Added,| and the whole brought up, as accurately as possible, to| the Present Condition of the Science.| By Edgar A. Poe.| Second Edition.| With illustrations of two hundred and fifteen shells,|presenting a correct type of each genus.| Philadelphia: |Published for the author, by| Haswell, Barrington, and Haswell|and for sale by the principal booksellers in the|United States.| 1840.|

[33]See the following references for opinions on this subject: Killis Campbell, The Mind of Poe and Other Studies. p. 145; William Gill, The Life of Edgar Allan Poe, New York, D. Appleton and Co, 1877, p. 93; James A. Harrison, Biography, Vol. I of Works, pp. 146-147; Gardner Teall, "Poe's Venture in Conchology," New York Times, Dec. 3, 1922.

[34]Ibid. [35]Works, Vol. XIV, pp. 95-96. [36]Ibid., pp. 97-100

conchology a genuine science, and holds that the proper study of this subject will give great help to the searcher after truth in geological matters.[37] Even if Poe did not write the whole book,,it seems evident that he must have had some definite knowledge of the subject. That he could be recognized as an authority, even in the time when the book was published, is extremely doubtful.

CHAPTER III

PHYSICS AND RELATED SCIENCES

Navigation

There is little evidence to show that Poe had enough knowledge of the science of navigation to enable him to assume command of a ship on the high seas, but there are in his collected works several items that seem to prove more than a passing interest in the study of navigation. A criticism of The Edinburgh Review contains a statement of the qualities of the magnetic pole as opposed to the pole where occurs the lowest temperature. After commenting on an article in the Review on a voyage of exploration to the Arctic regions and discussing the value of observations made by the explorer, Poe says, "The fact is that the Magnetic Pole is moveable, and, place it where we will, we shall not find it in the same place tomorrow. Notice is taken also by the critic that neither Captain nor Commander Ross has made reference to the fact that the Magnetic Pole is not coincident with the Pole of maximum cold."[1] Poe's statement is given with the air of an authority, as if he wished to impress the reader with his knowledge of the facts of the science of navigation. In his further discussion he quotes as authorities on the subject the observations of

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[1] Works, Vol. VIII, p. 87.

"Scoresby in East Greenland, and Sir Charles Giesecke and the Danish Governors in West Greenland."[2] Whether correct or not, the device is useful in setting forth the facts of the article on the voyage of exploration.

The attitude of one who is well acquainted with the principles of navigating ships at sea is maintained by Poe in a review of Maury's Navigation, which he thinks is one of the best books on the subject that ever appeared in America. The product of an officer in the American navy, this book, according to Poe, corrects many of the errors that have been prominent in the science of directing ships at sea. The following paragraph gives the scientific side of the review:

> We think that Mr. Maury has, to a considerable degree, avoided . . . errors . . . and while his work comprises a sufficient and even copious statement of the rules and facts important to be known in the direction of a ship, he has succeeded, by a judicious arrangement of particulars and by clearly wrought numerical examples, in presenting them in a disembarrassed and very intelligible form. With great propriety he has rejected many statements and rules which in the progress of nautical science have fallen into disuse, and in his selection of methods of computation, has, in general, kept in view those modern improvements in this branch of practical mathematics in which simplicity and accuracy are most happily combined.[3]

This statement seems to be an opinion expressed by a real navigator who knows the problems of the sea from actual experience.

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[2] Ibid.

[3] Works, Vol. IX, p. 49. (This quotation is used also in Chapter IV under Mathematics.)

Two other articles by Poe, both of them criticisms, show his interest in the problems of the sea. A review of the "Report of the Committee on Naval Affairs . . ." contains a detailed account of the difficulties faced by the American merchant marine in attempting to carry on commerce in the face of world competition. According to Poe, America has not done her part in exploration and scientific investigation of the problems of navigation, especially in the Pacific Ocean. He feels that it is a national duty for the government to take some definite action to help in charting and exploring the unknown regions of the Pacific. He says, "We have astronomers, mathematicians, geologists, botanists, eminent professors in every branch of physical science . . ."[4] America should not use a mass of scientific knowledge to which she has made no contribution; if she is to take her place among the nations of the world, she must make some effort to extend commerce in the regions of the Pacific.

In at least one other place in his prose works, Poe speaks of the subject of extending American commerce in the Pacific. The "Address on the Subject of a Surveying and Exploring Expedition to the Pacific Ocean and South Seas," by J. N. Reynolds, is the subject of a critical notice in which he reviews the projected undertaking of the government. This "Address" is a speech that was delivered on the

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[4] Ibid., p. 89.

floor of the House of Representatives; it is the plan of the project that was the result of the "Report of the Committee on Naval Affairs . . ." A more than passing interest in the subject of south sea exploration probably caused Poe to give for the second time the many reasons why the American nation should make every effort to help in the solution of the practical problems of navigation in the Pacific. This interest is apparently quite genuine,[5] and Poe seems to have a fair knowledge of the advantages of an extended trade in the Pacific. He seems to know, too, the numerous difficulties that face the seamen who venture to sail in those parts of the Pacific that are unexplored.

Meteorology and Astronomy

Poe's interest in meteorology and astronomy is somewhat similar to his interest in the problems of navigation, though there are fewer references to the latter science than there are to the former two. The similarity seems to lie in the idea that Poe's interest is that of the writer, not that of the scientist. Though the use of certain astronomical data assumes genuine scientific proportions, the scientific facts appear to be of minor importance in

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[5]It is possible that Poe as a writer was interested in voyages of exploration and discovery because of the wide popular interest in the subject. For a statement concerning these voyages, see W. T. Sedgwick and H. W. Tyler, A Short History of Science, New York, The Macmillan Co., 1925, p. 393.

the works where they occur. The only exception to this is the long prose essay Eureka.

There is at least one selection in which Poe mentions the conditions of weather that precede a hurricane. The "MS. Found in a Bottle," the story with which Poe won a prize of fifty dollars offered by the Baltimore Saturday Visiter,[6] contains an unusual account of the conditions that, according to the narrator of the story, may be observed before a hurricane strikes at sea. Poe's description is as follows:

> One evening, leaning over the taffrail, I observed a very singular, isolated cloud, to the N. W. It was remarkable, as well for its color, as from its being the first we had seen since our departure from Batavia. I watched it attentively until sunset, when it spread all at once to the eastward and westward, girting in the horizon with a narrow strip of vapor, and looking like a long line of low beach. My notice was soon afterwards attracted by the dusky-red appearance of the moon and the peculiar character of the sea. The latter was undergoing a rapid change, and the water seemed more than usually transparent. . . . The air now became intolerably hot, and was loaded with spiral exhalations similar to those arising from heated iron. As night came on, every breath of wind died away, and a more entire calm it is impossible to conceive. . . . I went below--not without a full presentiment of evil. Indeed, every appearance warranted me in apprehending a Simoom [a hurricane].[7]

Great realism in this description adds much to the effect of the story. The viewpoint is not exactly that of a scientist who is recording the phenomena of the weather before a storm; it is a seemingly logical discussion of the sea and the atmosphere as seen by a traveller.

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[6]Hervey Allen, Israfel, New York, George H. Doran Co., 1927, Vol. I, Footnote 444, p. 347.

[7]Works, Vol. II, pp. 2-3.

"The Unparalleled Adventure of Hans Pfaall" offers an example of Poe's use of astronomical information that appears to be truly scientific. The balloonist, Hans Pfaall, working out the details of his trip from the earth to the moon, finds that it will be necessary to calculate the distance between the two bodies. His solution of the problem is given in the following paragraph:

> Now, the mean or average interval between the centres of the two planets is 59.9643 of the earth's equatorial radii, or only about 237,000 miles. I say the mean or average interval;--but it must be borne in mind, that the form of the moon's orbit being an ellipse of eccentricity amounting to no less than 0.05484 of the major semi-axis of the ellipse itself, and the earth's centre being situated in its focus, if I could, in any manner, contrive to meet the moon in its perigee, the above-mentioned distance would be materially diminished. But to say nothing, at present, of this possibility, it was very certain that, at all events, from the 237,000 miles I would have to deduct the radius of the earth, say 4000, and the radius of the moon, say 1080, in all 5080, leaving an actual interval to be traversed, under average circumstances, of 231,920 miles.[8]

The use of terms that probably would be unintelligible to the average layman of Poe's time gives to the story an air of truth that is of great value. But it is significant that almost this entire account is taken from a book on astronomy published in 1834, Sir John F. W. Herschel's A Treatise on Astronomy.[9] This would seem to indicate that Poe used material from Herschel to bolster the story of Hans Pfaal's trip to the moon.

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[8] Works, Vol. II, p. 63.

[9] Meredith Neill Posey, "Notes on Poe's 'Hans Pfaall'," Modern Language Notes, Vol. XLV (Dec., 1930), pp. 503-504.

"Three Sundays in a Week," a brief narrative in which a young man secures his uncle's consent to marry the girl of his choice, shows how Poe can use the facts of the revolution of the earth about the sun in a way that might appeal to the reading public. The young man of the story proves to his uncle that three Sundays can come in one week, if one only considers that it is possible to move time ahead one day or back one day by making a complete trip around the earth, going east to move the clock twenty-four hours ahead, and west to reverse the action. According to Poe, this is possible because of the fact that the earth makes one complete revolution, twenty-four thousand miles, every twenty-four hours.[10] One investigator has stated that Poe based this story, just as he did parts of "The Unparalleled Adventure of Hans Pfaall," on Herschel's Treatise on Astronomy.[11] This seems to show that Poe was fond of using astronomical facts gleaned from his probable reading of Herschel's book. His use of these facts does not show that he was interested in the science of astronomy except as it might be of value to him as a writer.

Poe shows more interest in the movement of the whole solar system than he does in the revolution of the earth.

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[10] Works, Vol. IV, p. 234.

[11] Pannye N. Cherry, "The Source of Poe's 'Three Sundays in a Week'," American Literature, Vol. II (Nov., 1930), pp. 232-235, cites this book and an article "Three Thursdays in One Week" that appeared in the Philadelphia Public Ledger, Oct. 29, 1841.

"Mellonta Tauta" contains a somewhat detailed discussion of the idea that the whole solar system revolves about a single center of gravity. The enlightened traveller of the twenty-ninth century, who is the narrator of the story, cannot comprehend why the astronomers of the nineteenth century failed to learn that the star Alpha Lyrae and the sun both revolve about a central orb, the "common center of gravity"[12] of the entire solar system. Poe's line of reasoning in the story seems to indicate that he considers the whole system to be in revolution about this common center because the sun is equal in mass, as he says, to the rest of the solar system. His discussion of the astronomical point involved closes with this statement: "How incomprehensible . . . that considerations . . . did not at once indicate to them the true state of affairs--that of the binary revolution of our sun and Alpha Lyrae around a common center of gravity!"[13] The opinions expressed in this story are apparently given from a scientific viewpoint, but it is possible that this is but another example of Poe's use of astronomical information to serve the needs of a story.

In "Richard Adams Locke" in "The Literati of New York City" Poe devotes several paragraphs to the observations made by Locke in "The Moon Hoax" on the shape and topography of the moon. He says, "The topography throughout, even when

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[12] Works, Vol. VI, p. 209. [13] Ibid., p. 211.

professing to accord with Blunt's Lunar Chart, is at variance with that and all other lunar charts . . . Mr. L. has long details respecting oceans and other large bodies of water in the moon; whereas there is no astronomical point more positively ascertained than that no such bodies exist there."[14] His statement here assumes authority that seems to be genuine; evidently he did have some knowledge of astronomical discoveries concerning the moon and its phases. He mentions again[15] the distance between the earth and the moon, which is, "in round numbers, 240,000 miles."[16] He discusses other blunders committed by Locke in connection with lunar observations, and proves, to his own satisfaction at least, that Locke had no exact scientific information.

Though it does not have the scientific significance that is evident in the passages on the moon and its characteristics, the poem "Al Aaraaf" gives one more example of Poe's use of an astronomical idea. It is important because it is apparently the only poem in which Poe makes use of an idea that might be classified as being in the field of science. In the poem a new star, "independent

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[14] Works, Vol. XV, p. 131.

[15] See the discussion of the distance between the earth and the moon on p. 33.

[16] Works, Vol. XV, p. 130.

of the law of gravity,"[17] becomes the region in which the characters of the poem find heaven. This star, Al Aaraaf, has been used as the agent of destruction for the world; it becomes the center of the universe from which emanate rays of influence from God.[18] The evidence of the poem would seem to indicate that the astronomical idea of the poem is of secondary importance.

It is in the long prose poem Eureka that the astronomical knowledge which Poe had finds its real place of importance. Attempting to explain the universe and its origin,[19] Poe sets forth various astronomical facts to establish the idea that the distances between the stars and the planets maintain some definite order in their relation. The principal astronomical data given are the distances between the planets, their speeds of revolution, and the diameters of certain of the planets. A fair idea of the material given may be gained from the

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[17]Floyd Stovall, "An Interpretation of Poe's 'Al Aaraaf'," University of Texas Studies in English, No. 9, 1929, p. 107.

[18]Ibid. See this also for a detailed discussion of the poem. For a different interpretation see Richard Campbell and Marie Morgan Pettigrew, "Reply to Floyd Stovall's Interpretation of 'Al Aaraaf'," American Literature, Vol. VIII (Jan., 1937), pp. 439-445.

[19]For discussions of the plan and general purpose of Eureka see the following: Margaret Alterton and Hardin Craig, Edgar Allan Poe, Representative Selections, New York, American Book Co., 1935, "Introduction," p. xxxv ff.; Harvey Allen, Israfel, New York, George H. Doran Co., 1927, Vol. II, p. 739 ff.; John H. Ingram, Edgar Allan Poe, London, John Hogg, Paternoster Row, 1880, Vol. II, p. 148 ff.; George E. Woodberry, The Life of Edgar Allan Poe, New York, Houghton Mifflin Co., 1909, Vol. II, p. 237 ff.

following paragraph:

> Mercury, the planet nearest the sun, is distant from him 37 millions of miles. Venus, the next, revolves at a distance of 68 millions:--the Earth, which comes next, at a distance of 95 millions:--Mars, then, at a distance of 144 millions. Now come the eight Asteroids (Ceres, Juno, Vesta, Pallas, Astraea, Flora, Iris, and Hebe) at a distance of about 250 millions. Then we have Jupiter, distant 490 millions; finally Neptune, lately discovered, and revolving at a distance, say of 28 hundred millions. Leaving Neptune out of the account . . . it will be seen that, within certain limits, there exists an order of interval among the planets.[20]

Following this relation of distances between the planets, Poe gives, among other things, the diameter of the earth, the distance of the earth from the moon, and the diameter of Jupiter, the sun, and several other heavenly bodies. Part of this section of Eureka is said to be taken from Dr. Thomas Dick's Christian Philosopher.[21] The numerous astronomical facts seem to add much to the effectiveness of Eureka; it may be that Poe in this selection is trying to establish his theory of the universe with the aid of facts that are to all appearances mathematically correct, at least in so far as astronomical knowledge of Poe's time was correct.

This theory of the origin and destiny of the universe seems to be a type of evolution which has to do with all

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[20] Works, Vol. XVI, pp. 279-280.

[21] Margaret Alterton, Origins of Poe's Critical Theory, Iowa City, Iowa, University of Iowa Press, 1925, pp. 138-140.

the innumerable parts and atoms of the universe. One writer of the nineteenth century had this to say concerning the essay: "This is the most interesting to us of all of Poe's works . . . on account of the intrinsic attraction of the subject, which is the cosmogeny of the universe . . ."[22] Apparently Poe intends his readers to believe that the solar system of which our earth is a part is but one of an infinite number of systems that have evolved out of a single atomic structure that existed in the beginning of time.[23] This idea, which has been included in some way or another in a number of discussions of Eureka,[24] may be accepted as the evolution of the universe from one particle, each succeeding particle or atom contributing in its process of development innumerable other particles. This idea as applied to our own solar system might be stated in these words: "Our Solar System, beginning in the form of a nebula, assumed a spherical shape and, as its constituent atoms sought its center, began to revolve."[25] The working force of this process of evolution is the general principle of attraction and

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[22]"Article VIII," A Review of "The Works of the Late Edgar Allan Poe; with a Memoir by Rufus Wilmot Griswold, and Notices of his Life and Genius by N. P. Willis and J. R. Lowell," North American Review, Vol. LXXXIII (Oct., 1856), p. 432.

[23]Works, Vol. XVI, p. 266ff. [24]See Note 18, this chapter.

[25]Frederick Drew Bond, "Poe as an Evolutionist," Popular Science Monthly, Vol. LXXI (Sept., 1907), p. 271.

repulsion[26] that acts in the universe as the law of gravity.[27] This seems to be the extent of the astronomical data in Eureka that is concerned with the origin and development of the universe. The discussion of the soundness of the laws of Newton and Kepler, given by Poe[28] in connection with his explanation of his own theory, does not follow scientific method; the science of astronomy seems to be presented in Eureka through the use of facts and figures.

Poe mentions the state of the nebular cosmogony at least one time in addition to the detailed discussion in Eureka. In a footnote on a criticism of "Macaulay's Essays" he makes this statement, which is similar to the theory elaborated in Eureka: "This cosmogony demonstrates that all existing bodies in the universe are formed of a nebular matter, a rare ethereal medium, pervading space; shows the mode and laws of formation, and proves that all things are in a perpetual state of progress; that nothing in nature is perfected."[29] This seems to be another statement of the idea that the universe has evolved from an original atomic body, and that all the universe is still moving toward an ultimate end.[30]

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[26] Ibid., p. 270.

[27] Works, Vol. XVI, p. 279.

[28] Ibid., p. 197 ff.

[29] Works, Vol. X, p. 160.

[30] See the references given in Note 18, this chapter.

It seems evident that Poe as an astronomer was more concerned with showing the origin of the universe than with establishing any definite astronomical facts with scientific accuracy. That he "endeavored to keep abreast of the discoveries in astronomical science"[31] and that he used these discoveries to serve his own purposes in writing, appears to be the main conclusion that might be reached concerning Poe the astronomer. His interest in the subject seems to be that of the writer, not that of the impartial scientist whose efforts are directed toward establishing definite facts. Only in Eureka do Poe's ideas of astronomy approach genuine scientific significance, and even here the facts are subordinate to a theory of the universe, which may or may not be correct.

Physics

It is probable that Poe picked up a number of principles of physical science in connection with his reading in astronomy.[32] He uses at least five principles that might be attributed to the science of physics. "The Unparalleled Adventure of Hans Pfaall" contains a statement concerning the displacement of the air by an ascending balloon. The balloonist says that his upward flight will not be arrested until he reaches a point "where the united

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[31] Killis Campbell, The Mind of Poe, Footnote, p. 17.

[32] Ibid.

weights of my immense balloon, the inconceivably rare gas within it, the car, and its contents, should equal the weight of the surrounding atmosphere displaced . . ."[33] This sentence, italicized by Poe, gives to the projected flight to the moon a basis of apparently scientific accuracy.[34]

"A Descent into the Maelstrom" gives an interesting example of Poe's use of a principle of physics. In telling of his descent into the vortex of a large whirlpool, the narrator of the story makes this statement:

> I made . . . three important observations. The first was that as a general rule, the larger the bodies were, the more rapid their descent;--the second, that, between two masses of equal extent, the one spherical, and the other of any other shape, the superiority in speed of descent was with the sphere;--the third, that, between two masses of equal size, the one cylindrical, and the other of any other shape, the cylinder was absorbed the more slowly.[35]

This principle is attributed by Poe to Archimedes; one investigator has said that Poe, "within his rights as a creative artist,"[36] made his own principle and attributed it to Archimides "in the interest of verisimilitude."[37] This evidence tends to show that Poe used science to serve his own ends as a writer. Possibly "A Descent Into the

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[33] Works, Vol. II, p. 66.

[34] See the discussion of this story under Chemistry, Chapter I.

[35] Works, Vol. II, p. 245.

[36] Killis Campbell, "Marginalia on Longfellow, Lowell, and Poe," Modern Language Notes, Vol. XLII(Dec., 1927) p. 520.

[37] Ibid.

Maelstrom," based as it is upon the physical principle that Poe gives in the story, shows how a writer should make use of science to make his assertions credible to the reading public.

In "The Literati of New York City," "Richard Adams Locke," Poe discusses at length the space penetrating power of telescopes. Commenting on the observations made by Locke on the moon, he says:

> There is a real and very definite limit to optical discovery among the stars, a limit whose nature need only be stated to be understood. If, indeed, the casting of large lenses were all that is required, the ingenuity of man would ultimately prove equal to the task, and we might have them of any size demanded; but, unhappily, in proportion to increase of size in the lens, and consequently of space-penetrating power, is the diminution of light from the object by diffusion of the rays.[38]

This item is given with the characteristic assurance--unstated, it is true--that gives to so many of Poe's scientific statements the appearance of genuine authority, but it is possible that this is an attitude assumed in this instance to bolster the criticism of Locke.

Poe pays some attention to rays of light in "The Thousand-and-Second Tale of Scheherazade." In one of the numerous footnotes in the story occurs this passage:

> If two red rays from two luminous points be admitted into a dark chamber so as to fall on a white surface, and differ in their length by 0.0000258 of an inch,

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[38] Works, Vol. XV, p. 133. Poe seems to regard the power of telescopes as being governed by physical principles.

> their intensity is doubled. So also if the difference in length be any whole-number multiple of that fraction. A multiple by $2\frac{1}{2}$, $3\frac{1}{2}$, &c., gives an intensity equal to one ray only; but a multiple by $2\frac{1}{2}$, $3\frac{1}{2}$, &c., gives the result of total darkness. In violet rays similar effects arise when the difference in length is 0.000157 of an inch, and with all other rays the results are the same--the difference varying with a uniform increase from the violet to the red.[39]

Poe adds the idea that "analogous experiments in respect to sound produce analogous results."[40] In a section of "Marginalia" he makes another observation concerning sound waves. He says that he can see the color of a gnat when he hears the insect's buzz,[41] and that "the vibrations of the tympanum caused by the wings of the fly, may, from within, induce abnormal vibrations of the retina, similar to those which the orange ray induces, normally, from without."[42] These allusions to apparent principles of physics give an idea that Poe was interested in speculating concerning scientific facts in the field of physics.

Whether much of Poe's knowledge in the fields of physics, astronomy, and navigation is genuine and authoritative, or assumed and pretended, it is difficult to determine. It has been shown that he refers to the science of navigation or some related idea at least four times; that he makes use of various astronomical facts and data no less than eight times; and that he in five instances

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[39] Ibid., Vol. VI, p. 99. [40] Ibid.

[41] Ibid., Vol. XVI, p. 18. [42] Ibid.

refers to certain principles of physics. The various allusions to these branches of science in Poe's works seem to indicate that he had some definite information that might be truly scientific; it is certain only that he had an interest in these branches of science, and that he made use of his interest and what information he had in his work as a writer.

CHAPTER IV

MATHEMATICS AND INVENTION

Mathematics

There is present in Poe's prose works definite evidence that he was more of a scientist in the field of mathematics than he was in the field of physics. Mathematics was a subject "that always attracted him," and in which he "was seventeenth in a class of eighty-seven"[1] while he was at West Point. His standing in the subject in the academy would seem to indicate a better than average knowledge of mathematics. In at least four of his prose selections he mentions the subject of mathematics.

The article "Maelzel's Chess Player" gives, in connection with a description of a mechanical chess player, the difference between the moves in a game of chess and the solution of an algebraic formula. He says that each step in solving a problem in algebra is predetermined by the data given in the preceding steps of the problem. "The second step having been a consequence of the data, the third step is equally a consequence of the second, the fourth of the third, the fifth of the fourth, and so on, and not possibly otherwise, to the end."[2] This statement can be accepted as algebraically correct, and is one definite indication that Poe possessed

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[1] Killis Campbell, The Mind of Poe, p. 16.

[2] Works, Vol. XIV, p. 10.

specific knowledge of mathematics, at least in the subject of algebra.

The second selection in which Poe makes use of facts of mathematics is a criticism of a book called The Doctor. In describing the monogram that appears on the back of the book, Poe says, "This monogram is a triangular pyramid; and as, in geometry, the solidity of every polyhedral body may be computed by dividing the body into pyramids, the pyramid is thus considered as the base or essence of every polyhedron."[3] This principle of geometry, included by most schools in beginning courses in solid geometry, is mathematically correct, just as the algebraic principle given in "Maelzel's Chess Player." Poe uses the principle in this criticism of The Doctor to illustrate his views of the book, but it is significant that he is able to use a geometrical principle in a book review so that the mathematical theorem, correct in itself, contributes to the general effect of the review. This use might indicate a thorough knowledge of the subject of geometry, since it is improbable that Poe took the trouble to find this particular mathematical fact just for this particular book review.

The long prose selection Eureka contains several formulas that may be classified as mathematical. In describing the manner in which the universe has been formed through the diffusion of matter, Poe states that each sphere formed in the universe has received in the diffusion of matter a number

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[3] Ibid., Vol. IX, p. 69.

of atomic particles, the number of which in each stratum is proportional to the extent of the surface of the sphere.[4] He adds that the surfaces of these spheres are proportional as the squares of their radii. In his discussion of the nature of the solar system[5] he attempts to show that the paths of the planets in their revolutions are elliptical in shape. He says, "An ellipse is a curve, returning into itself, one of whose diameters is longer than the other. In the longer diameter are two points, equidistant from the middle of the line . . ."[6] After defining the paths of the planets about the sun in this way, he attempts to prove that those planets nearest the sun move the most rapidly. Whether these statements are mathematically correct or not, this use of terms peculiar to the study of geometry aids Poe to establish his theory concerning the origin and nature of the universe.

Poe's "Addenda" to Eureka sets forth several formulas concerning the speeds of rotation of the planets and the size of their orbits. He says that the speed of rotation of a planet must be increased or diminished if the planet is moved inward or outward from its position in relation

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[4]Works, Vol. XVI, p. 231.

[5]See a discussion of this under Astronomy, Chapter III.

[6]Works, Vol. XVI, pp. 277-278.

to the center of the solar system.[7] He proves, to his own satisfaction at least, that if two planets were to exchange orbits, "the smaller and less dense planet" would have to increase the size of its orbit by the "ratio of the other's diameter and density to the diameter and density of itself."[8] This and similar statements, relative to the orbits of the planets, though not perfectly clear, illustrate better than any other items Poe's great interest in mathematics. It seems from the discussions given in Eureka and the "Addenda" to Eureka that Poe uses mathematical principles and terminology to prove his theory of the universe.[9] The scientific exactness of mathematics seems to have held for him a fascination rivalled only by his interest in other sciences and pseudo-sciences of his time. It would be difficult to determine the extent of Poe's knowledge of mathematics. It is certain only that he knew a few facts in algebra and geometry, and that he may have had other specific knowledge of mathematics in its relation to astronomy. It might be well to conclude that Poe as a mathematician has "considerable ingenuity in the manipulation of figures" and an acquaintance with the facts of the science "well beyond that possessed by the average layman of intelligence at the present time."[10]

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[7] Ibid., pp. 340-341. [8] Ibid., p. 343.

[9] See Margaret Alterton and Hardin Craig, Editors, Edgar Allan Poe, Representative Selections, New York, American Book Co., 1935, "Introduction," pp. xxix-xl; and A. R. Wallace, Edgar Allan Poe, New York, Privately Printed, 1930, p.8.

[10] Killis Campbell, The Mind of Poe, p. 16.

Poe's interest in mathematics probably led him to use certain items of knowledge which lie in the field of engineering.

So far as I have been able to determine, Poe's use of ideas that may be classified in this field is limited to a discussion of the principles of building, which is found in "Some Account of Stonehenge," and a discourse on the advantages of different types of streets, which appears in the article on "Street Paving." The first of these selections has for its subject "an assemblage of upright and prostrate stones on Salisbury plain, England . . . generally supposed to be the remains of an ancient Druidical temple."[11] The stones in this ruin seem to have been "squared or hewn by art," and the ruin seems to have been constructed with some knowledge of the principles of building. Poe says that the original structure consisted of rows of stones laid in circular fashion. The stones were "attached to the uprights by mortices and tenons, or regular cavities in the horizontal blocks, with projecting points in the perpendicular ones."[12] There were originally four circles of stones. The remains of the two inner circles show that the stones were laid with fine workmanship. Poe shows some slight knowledge of the principles of building construction, but the extent of this knowledge is apparently

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[11] Works, Vol. XIV, p. 110. [12] Ibid., p. 111.

rather small.

The article on "Street Paving" shows that Poe was interested in the problems of road construction. He does not exhibit the knowledge of a civil engineer, but he does appear to be acquainted with the history of highway construction and the relative advantages of stone roads and roads constructed of wooden blocks. He describes the ancient roads of the Romans and the nineteenth century "quadrangular stone-block pavement,"[13] which, though very durable, contributes greatly to the "insufferable nuisance of street-noise." He sets forth the process by which wooden blocks may be preserved[14] and states the advantages of wooden pavements over stone pavements. The wood, though not so durable as the stone, lessens the noise to a great extent. It appears that Poe was interested in the problems of street paving from the standpoint of a writer and layman; his technical knowledge of the subject was very limited. He probably used the subject because of its interest to the public, and not because of any scientific regard for the principles of engineering involved in road construction.

Invention

It seems evident that Poe used inventions to motivate

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[13] Ibid., p. 166.

[14] See Chemistry, Chapter I, for a discussion of this item.

several of his stories and articles. "The Thousand-and-Second Tale of Scheherazade" contains probably more references to inventions than any other single story or article. The king is astounded to hear of a "hen without feathers, but bigger than a camel," made of brick and iron and capable of bringing forth a hundred chickens in one day.[15] This marvelous machine, Poe explains in a footnote, is the "Eccaleobion,"[16] quite evidently the forerunner of the modern incubator. On the same page Poe speaks, through Scheherazade, of a huge horse, made of iron and full of boiling water instead of blood, capable of attaining a speed surpassing the flight of most birds.[17] This animal is explained by the note: "On the great Western Railway, between London and Exeter, a speed of 71 miles per hour has been attained."[18] Scheherazade relates too how a powerful magician created a man out of brass and leather, "and endowed him with such ingenuity that he would have beaten at chess, all the race of mankind . . ."[19] Another magician constructed a creature that "performed calculations of so vast an extent that they would have required the united labor of fifty thousand fleshly men for a year."[20] These two great creations

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[15] Works, Vol. VI, p. 97.
[16] Ibid.
[17] Ibid.
[18] Ibid.
[19] Ibid.
[20] Ibid.

are, respectively, "Maelzel's Automaton Chess-player" and "Babbage's Calculating Machine."

Further in the story Poe mentions a fine invisible wire, which is "made of platinum for the field of views in a telescope," and can be seen "only by means of the microscope."[21] He takes notice of the voltaic pile, which has the power to make a corpse perform unusual feats;[22] he says that the "Electro Telegraph transmits intelligence instantaneously--at least so far as regards any distance upon the earth."[23] He describes a printing apparatus and the daguerreotype. These numerous inventions receive rather brief attention, but a chemical process for the manufacture of ice is described in detail. Poe's footnote giving the process is as follows:

> Place a platina crucible over a spirit lamp, and keep it a red heat; pour in some sulphuric acid, which, though the most volatile of bodies at a common temperature, will be found to become completely fixed in a hot crucible, and not a drop evaporates--being surrounded by an atmosphere of its own, it does not, in fact, touch the sides. A few drops of water are now introduced, when the acid immediately coming in contact with the heated sides of the crucible, flies off in sulphurous acid vapor, and so rapid is its progress, that the caloric of the water passes off with it, which falls a lump of ice to the bottom . . .[24]

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[21] Ibid., p. 98. [22] Ibid., p. 99. [23] Ibid.

[24] Ibid., pp. 99-100. (It may seem that this example of Poe's knowledge of invention should be included under Chemistry, but the use of the item in the story seems to justify placing it in the section on Invention.) Killis Campbell, The Mind of Poe, p. 19, has recorded this item of Poe's knowledge.

This description may have been correct in Poe's time, but it is significant that elementary courses in chemistry of the present day include the fact that sulphuric acid is not greatly subject to evaporation at common temperatures. That Poe was not much of a chemist has already been noted; this may be another indication of the same idea.[25]

Whether correct in every detail or not, these numerous references to inventions in "The Thousand-and-Second Tale of Scheherazade" seem to indicate that Poe attempted to keep up with the progress of discovery in the field of inventions. Just how much he really knew of the various machines he mentions would be difficult to determine.

In "Mellonta Tauta" he shows some knowledge of ships and balloons, and refers a second time to the telegraph and the railroad. The narrator of the story asks with all seriousness, "Are we forever to be doomed to the thousand inconveniences of the balloon?"[26] The travellers on the balloon note with some surprise a small ship of about six thousand tons.[27] The description of the boat in the story seems to indicate that Poe considers a six thousand ton ship will be obsolete in the twenty-ninth century. It is interesting that invention of ships has gone far beyond this point less than a hundred years after Poe.

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[25]See Chemistry, Chapter I.

[26]Works, Vol. VI, p. 197. [27]Ibid., p. 199.

With an air of vast knowledge of the subject, he speaks of floating telegraph wires that span the Atlantic. He wonders how the people of the country could have had the idea that it would be a difficult matter to convey wires over the sea.[28] Again it is significant that Poe, in attempting to get ahead of his time, makes a slight mistake, this time in relation to the position of the wires, which he places on top of the water instead of under the water, as the trans-Atlantic telegraph cable is laid. His reference to the railroad also goes slightly astray from twentieth century standards in depicting the advances which he thinks the railway will achieve. The tracks of the railroad of the twenty-ninth century are fifty feet wide, and the trains attain speeds in excess of two and three hundred miles per hour.[29] To judge by twentieth century standards these items that are apparently attempts to outline the future development of certain inventions known to the nineteenth century, is probably unfair to Poe. Their true significance possibly lies in the indication that Poe was interested in the progress of inventions, and made certain prophecies as to the future development of those inventions in which he had a particular interest. He places these developments one thousand years ahead, not one hundred years; this might show that he was trying to

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[28] Ibid., p. 200.

[29] Ibid., pp. 206-207.

make the story more nearly credible to his readers, who would have to judge the narrative by the known status of inventions in the nineteenth century.

In an article called "Maelzel's Chess Player" Poe compares the relative merits of the automatic chess player and the calculating machine invented by Babbage, "which can not only compute astronomical and navigation tables to any given extent, but render the exactitude of its operations mathematically certain . . ."[30] This machine has the added ability to print the elaborate results of its calculations "without the slightest intervention of the intellect of man." Poe argues that the invention of Babbage is far below the chess player in ingenuity, for "arithmetical or algebraical calculations are, from their very nature, fixed and determinate."[31] If certain mathematical facts are given, then certain results must necessarily follow; the results are influenced by nothing except the facts given. This seems to prove to Poe that a machine that has the ability to play a complicated game is far superior to a machine that can only make mathematical calculations. To prove that automata are not at all uncommon, Poe describes the actions of a mechanical duck invented by Vaucanson. This remarkable fowl was constructed exactly like a real duck, and could perform all the movements of which a living duck was capable. These inventions, the calculating machine, the automatic

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[30] Works, Vol. XIV, p. 9. [31] Ibid.

chess player, and the mechanical duck, serve as illustrations of Poe's interest in unusual inventions that operate on mechanical principles. In this article he seems to have definite knowledge concerning these inventions, though he does not make any attempt to explain the principles of mechanics involved in their operation.

An article called "Anastatic Printing" contributes another example of Poe's knowledge in the field of inventions. He describes in some detail a recently invented process of printing that has become known as anastatic printing. "By means of this discovery anything written, drawn, or printed, can be made to stereotype itself, with absolute accuracy, in five minutes."[32] Because Poe shows great enthusiasm for this invention, I quote the entire passage giving the process as Poe describes it:

> Let us take, for example, a page . . . supposing only one side of the leaf to have printing on it. We dampen the leaf with a certain acid diluted, and then place it between two leaves of blotting paper to absorb superfluous moisture. We then place the printed side in contact with a zinc plate that lies on the table. The acid in the interspaces between the letters, immediately corrodes the zinc, but the acid on the letters themselves, has no such effect, having been neutralized by the ink. Removing the leaf at the end of five minutes, we find a reversed copy, in slight relief, of the printing on the page;--in other words, we have a stereotype-plate, from which we can print a vast number of absolute facsimiles of the original printed page--which latter has not been at all injured in the process--that is to say, we can still produce from it (or from any impression of the stereotype-plate) new stereotype-plates ad libitum.[33]

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[32] Works, Vol. XIV, p. 154. [33] Ibid.

The invention is of great importance, according to Poe, because a publisher will now be able to produce several editions of the same work with but a trifle of the expense formerly involved. Probably Poe knew the facts of this invention, which seems to be correctly described, because of his work as a writer and magazine editor. As an editor of a magazine, he would have to take advantage of every opportunity for cutting costs of printing, and this new invention seemed to offer great possibilities.

The "Marginalia" contains an observation by Poe on a discovery of a German optician that would be of value in the theater. This invention consists of throwing a shadowy figure by optical means.[34] Poe does not attempt to tell how the illusion of a figure, which was successfully used in the production of "Macbeth," is achieved; he merely exhibits a passing interest in the discovery.

Poe's interest in inventions led him to pay some attention to the subject of aeronautics. No fewer than five of his stories contain allusions to either the science of aeronautics or the problems of balloon travel.[35] Two of these, "The Unparalleled Adventure of Hans Pfaall" and "Mellonta Tauta" are descriptions of travel by balloon,

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[34] Ibid., Vol. XVI, p. 35.

[35] Killis Campbell, Editor, Poe's Short Stories, "Introduction," p. xviii.

the first being an account of a trip to the moon,[36] and the second a story of balloon travel in the twenty-ninth century.[37] "The Angel of the Odd" tells how the narrator of the story has a miraculous escape from death. In a fall from a steep precipice, he is fortunate enough to catch the guide rope of a balloon that is passing. "The Man That Was Used Up" contains brief mention of the "balloon packet" that will make regular trips between London and Timbuctoo.[38] In none of these four stories is there apparent any attempt to consider the subject of balloon travel from the truly scientific viewpoint.

"The Balloon Hoax" seems to be the only story in which Poe makes an effort to set forth some scientific principles of aeronautics. In a letter to the Columbia Spy Poe makes the following observation concerning his story of a trip across the Atlantic by Balloon: "The 'Balloon-Hoax' made a far more interesting sensation than anything of that character since the 'Moon-Story' of Locke. . . . There is nothing put forth in the Balloon-Story which is not in full keeping with the known facts of aeronautic experience--which might not really have occurred. . . . I shall not be in the least

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[36]This story has received some attention under Medicine and Chemistry, Chapter I, and under Astronomy, Chapter III.

[37]See the discussion under Invention, this Chapter, and under Astronomy, Chapter III.

[38]Works, Vol. III, p. 263.

surprised to learn . . . that a balloon has made the actual voyage so elaborately described . . ."[39] This would seem to indicate that Poe believed that the aeronautical principles stated in "The Balloon Hoax" were substantially correct, at least from the standpoint of the science in the nineteenth century. The description of the model balloon constructed by Mr. Monck Mason before his flight across the Atlantic is worth quoting:

> The weight of the whole machine and apparatus was seventeen pounds--leaving about four pounds to spare. Beneath the center of the balloon, was a frame of light wood, about nine feet long, and rigged on the frame of the balloon itself with a network in the customary manner. From this framework was suspended a wicker basket or car.
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> The screw consists of an axis of hollow brass tube, eighteen inches in length, through which, upon a semi-spiral inclined at fifteen degrees, pass a series of steel wire radii, two feet long, and thus projecting a foot on either side. . . . At each end of its axis this screw is supported by pillars of hollow brass tube descending from the hoop. In the lower ends of these tubes are holes in which the pivots of the axis revolve. From the end of the axis which is near the car, proceeds a shaft of steel, connecting the screw with the pinion of a piece of spring machinery fixed in the car. . . . The rudder was a light frame of cane covered with silk shaped somewhat like a battledoor . . . It could be turned <u>flat</u>, and directed upwards or downwards, as well as to the right or left; and thus enabled the aeronaut to transfer the resistance of the air which in an inclined position it must generate in its passage, to any side upon which he might desire to act; thus determining the balloon in the opposite direction.[40]

The large balloon in which Mason makes the trip across the

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[39] Jacob E. Spannuth and Thomas Ollive Mabbott, <u>Doings of Gotham by Edgar Allan Poe . . .</u>, pp. 33-34.

[40] <u>Works</u>, Vol. V, pp. 227-228.

ocean from Europe to America is constructed on the same principles as this model. Whether the details of the balloon's construction are correct from the standpoint of nineteenth century aeronautics, is very difficult to say. It seems that Poe possessed some definite knowledge of the subject, and in this story there is an apparent scientific attitude. Though the story appeared as a hoax, it may be that some of the thoughts concerning balloon construction and navigation are correct. Just how much Poe actually knew of the science of aeronautics, which was still in the elementary stages in the nineteenth century, is hard to say. Probably his interest in the subject from the standpoint of a writer was greater than his knowledge.

CHAPTER V

PSYCHOLOGY AND METAPHYSICS

Psychology

Not only do Poe's numberous references to science indicate that he wishes to be thought a scientist, but his use of ideas that may be classified as pseudo-scientific tends to show that he made an effort to be a scientist in fields of knowledge not truly scientific. The study which we know today as psychology was probably in Poe's time not established as a definite science.[1] In his prose works there are several items that may be classified in the field of psychology.

"Berenice" contains an interesting description of a peculiar monomania which afflicts the narrator of the story. This mania causes the victim to have an intense and nervous interest in the most "ordinary objects of the universe."[2] The sufferer is prone to become absorbed in the most trivial things, such as the margin of a book, a shadow on a door, the embers of a fire, or the flame of a lamp.[3] He does not

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[1]See Gardner Murphy, An Historical Introduction to Modern Psychology, New York, Harcourt, Brace and Co., 1929, Part I, "The Pre-Experimental Period."

[2]Works, Vol. II, p. 19. [3]Ibid.

seem particularly subject to what is commonly known as day-dreaming; rather he has developed to an abnormal degree the powers of the mind known as the attentive. It is this abnormality which causes him to remove the teeth from the corpse of Berenice. He becomes so involved in contemplation of the lady's teeth that he evidently acts without conscious volition. Poe seems to think that it may be possible for a person to become temporarily insane through long meditation on a subject which is in itself trivial.

In two of his stories he speaks of a spirit of perverseness, apparently akin to the monomania in "Berenice," that may cause a person to do a thing which he knows to be wrong. This perversity of spirit seems to be an established part of the human mind; at times it may become unconquerable. "The Black Cat" presents a picture of a man driven by drink to loss of self control. In an ungovernable fit of rage the narrator of the story partially blinds his pet cat by cutting out one of its eyes. After this act of cruelty he seems bound on destruction. His words are as follows:

> And then came, as if to my final and irrevocable overthrow, the spirit of Perverseness. Of this spirit philosophy takes no account. Yet I am not more sure that my soul lives, than I am that perverseness is one of the primitive impulses of the human heart--one of the indivisible primary faculties, or sentiments, which give direction to the character of Man. Who has not, a hundred times, found himself committing a vile or silly action, for no other reason than because he knows he should not? Have we not a perpetual inclination, in the face of our best judgment, to violate that which is Law, merely because we understand it to be such?[4]

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[4] Ibid., Vol. V, p. 146.

Speaking thus through the mouth of a character in the story, Poe states what seems to be one of his beliefs concerning psychology. This paragraph in the story assumes a serious turn; apparently Poe means what he says. Although he is using this pseudo-scientific principle to add to the effect of the story, I am inclined to believe that Poe describes what he takes to be a fundamental law of human behavior. He believes that every person is psychologically inclined at times to obey this spirit of perverseness.

"The Imp of the Perverse" contains a positive statement of Poe's belief in the principle of perverseness, which in this story causes a murderer to confess a crime that is undiscovered. The first half of the narrative gives a detailed discussion of the phrenological aspects of the spirit of perverseness.[5] That part of the discussion that may be called psychological, describing the spirit of the perverse, is as follows:

> Through its promptings we act without comprehensible object; or, if this shall be understood as a contradiction in terms, we may so far modify the proposition as to say, that through its promptings we act, for the reason that we should not. In theory, no reason can be more unreasonable; but, in fact, there is none more strong. With certain minds, under certain conditions, it becomes absolutely irresistible. I am not more certain that I breathe, than that the assurance of the wrong or error of any action is the one unconquerable force which impels us, and alone impels us to its prosecution.[6]

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[5] See Chapter VI.

[6] Works, Vol. VI, p. 147.

The certainty with which Poe makes this statement is evidence that he believes his theory to be scientific. Poe seems to think this theory of human conduct is the only one that can account for the actions of some people under certain circumstances. The principle of doing things because they are wrong--as Poe views it--is one of the elementary laws of human behavior; some impulse drives a person to do that which he realizes to be wrong. Poe makes no effort to explain the cause of this peculiar faculty of the mind; he says that it will not "admit of analysis or resolution into ulterior elements."[7] He does not attempt to prove his theory from a scientific viewpoint, but he connects it with what was in his time the science of phrenology. In "The Imp of the Perverse," just as in "The Black Cat," the theory operates, primarily, to make credible the unusual events of the story, but Poe himself professes to believe the theory.

Poe dwells longer on the spirit of the perverse in human nature than he does on the faculty of memory, to which he refers at least twice. In a criticism of "Letters to Young Ladies," by Mrs. L. H. Sigourney, he says:

> Few subjects are more entirely misapprehended than that of the faculty of Memory. For a multiplicity of errors on this head Leibnitz and Locke are responsible. That the faculty is neither primitive nor independent is susceptible of direct proof. That it exists in

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[7] Ibid.

> conjunction with each primitive faculty, and inseparable from it, is a fact which might be readily ascertained, even without the direct assistance of Phrenology.[8]

To what extent Poe was acquainted with the works of Leibnitz and Locke it would be difficult to determine. The direct assertion that these two are responsible for misapprehensions concerning the faculty of memory adds some weight to Poe's opinion, but it is significant that he does not attempt to quote from these two writers to prove his theory that memory is not an independent faculty. Poe also fails to explain just how the connection between memory and the original faculties of the mind "might be readily ascertained." His thorough belief of this theory is just as evident as his acceptance of the strange spirit of the perverse, and he states that the study of phrenology can establish both theories as correct.

The "Marginalia" contains another allusion to the faculty of memory. In a discussion of the powers of different individuals to read rapidly vast numbers of books, Poe observes that the individual's mind is sometimes capable of retaining everything that he reads. He does not mention memory itself, but he speaks of the ability of the human intellect to develop its powers of retention. This development may result in an increased facility in reading

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[8] Ibid., Vol. IX, pp. 65-66. The faculty of memory is treated also under Phrenology, Chapter VI.

and appreciation of what is read. Careful reading habits will give to the reader "an instinctive and seemingly magnetic appreciation of the thing written . . . Long years to come, with a careful analysis of the mental process, may even render this species of appreciation a common thing."[9] Poe apparently believes that appreciation of the written word comes to the reader through development of the powers of memory and diligent practice in reading. He makes no effort to establish his principle of reading, and he admits that further study of the processes of the mind may add much to the principle. His attitude toward memory in reading, memory as a mental faculty, the spirit of the perverse, and a peculiar monomania described in "Berenice" is consistently that of the writer who tries to treat scientifically theories that are at best only pseudo-scientific. It is possible that Poe's theories of the mind are correct by the standards of twentieth century psychology, but that is a point which would require careful and painstaking consideration.

Metaphysics

Poe's use of metaphysical ideas is more extensive than his use of psychological ideas. He speaks in various places of the doctrine of transmigration of souls, of life after death, and of the spiritual nature of the universe in its relation to God. He is absorbed by the abstractions of

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[9] Works, Vol. XVI, p. 13.

metaphysics, and theories of the origin of the universe are of importance in his work.

Five of Poe's stories and at least one criticism contain ideas on the subject of reincarnation and transmigration. "Morella" describes how a mother, after her death, returns to life in the body of her daughter. As she dies, she declares to her husband that her child will be a pledge of the affection that has existed between them. True to the mother's prophecy, the child lives and becomes the center of her father's affection. The father is amazed at the rapid mental development of his daughter, and he daily discovers "in the conceptions of the child the adult powers and faculties of the woman."[10] He has a mysterious dread that the dead Morella, his wife, will return to life; this fear prevents his daughter's receiving the ceremony of baptism until she is grown. When she is christened Morella, she falls dead. Her dying words, "I am here!" indicate that the spoken word "Morella" completes the mysterious change in which the spirit of the dead mother takes possession of the body and spirit of her daughter. The reincarnation of Morella in her daughter goes farther than the transferring of a soul into a living body; Morella's very physical substance seems to take part in the transmigration. Poe makes no statement in the story as to the scientific truth of the doctrine of transmigration; he uses the idea as the underlying principle

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[10] Works, Vol. II, p. 31.

of the story.

"Morella" presents a consideration of reincarnation wherein the soul of a mother passes into the body of her daughter; "Ligeia" contains an account of the reincarnation of one woman in the body of another. The first wife of the narrator of the story, the black-haired Ligeia, possesses an indomitable will which refuses to yield to death. In her dying moments she speaks of the possibility of conquering death through the power of the human will. Some months after the death of Ligeia, the narrator marries the "fair-haired and blue-eyed Lady Rowena Trevanion, of Tremaine."[11] Rowena becomes ill in the second month of her marriage and dies after a brief illness. Her husband prepares the body for burial and sits through one night in the room with the corpse. He is astounded when Rowena shows signs of returning to life; he makes every effort to revive her, but seems to fail in his endeavor. About an hour after he has ceased all exertion to call Rowena back to life, her corpse makes a convulsive movement and arises from the couch on which she was laid. The body which rises from death is the body not of Rowena but of Ligeia. Through the power of her will to live, Ligeia apparently succeeds in returning to life in the body of Rowena. Poe uses the device of transmigration as the underlying idea of the story, just as he does in

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[11] Ibid., p. 259.

"Morella." This theory which he uses as the theme of the story is "one phase of metempsychosis--that Pythagorean belief in the transmigration of souls."[12]

The doctrine of transmigration receives attention in three other stories by Poe. Poe describes the reincarnation of a woman in a picture, of a man in another man, and of a man in a horse. All of these stories are based on the same principle as "Morella" and "Ligeia." Poe relates in "The Oval Portrait" how an artist transfers his wife's likeness to canvas in such a skillful manner that the lady's very life seems to pass from her body into the portrait.[13] Poe makes no attempt here to elaborate the principle of reincarnation as he does in both "Morella" and "Ligeia." "A Tale of the Ragged Mountains" contains a detailed description of the marvels of mesmerism;[14] Poe devotes only brief space to reincarnation. A Dr. Templeton establishes magnetic relations with his friend Augustus Bedloe. During a tramp in the country one afternoon, Bedloe has a marvelous vision.[15] He passes through an experience which he cannot explain; in the vision he is killed while taking part in a fight. After hearing the story of the vision, Templeton tells his friend

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[12]Margaret Alterton and Hardin Craig, Edgar Allan Poe, Representative Selections, "Introduction," p. xcv.

[13]Ibid., Vol. IV, pp. 247-279.

[14]See Chapter VII.

[15]Works, Vol. V, pp. 168-173.

that the death of a man whose name was Oldeb occurred in exactly the manner described. Poe makes it clear that Bedloe is a reincarnation of Oldeb, who has been dead many years.

"Metzengerstein" contains an example of transmigration wherein the spirit of a man finds a new life in the body of a horse.[16] Count Berlifitzing after his death apparently returns to life in a high-spirited and unusually intelligent stallion, which is appropriated by the count's enemy, Baron Metzengerstein, for his own personal use. The baron seems to sense something almost human in the aspect of the horse, and he makes every effort to conquer the animal. In a midnight ride on the horse, he loses control of his mount and is borne to his death in the destruction of his own castle by fire. The origin of the fire is not explained, neither is the mysterious action of the baron in persisting in his attempts to conquer the horse. Poe intimates that the horse is an avenging reincarnation of Count Berlifitzing, who at last succeeds in overthrowing his enemy, Baron Metzengerstein. Transmigration of the spirit of Berlifitzing into the body of the horse is the principle of the story.

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[16] Ibid., Vol. II, pp. 185-196. For a discussion of the possible sources of this story, see Grace P. Smith, "Poe's Metzengerstein," Modern Language Notes, Vol. XLVIII (June, 1933), pp. 356-359.

In a criticism of a novel called Sheppard Lee, a book which according to Poe is based upon successive reincarnations of the hero, Poe gives a definite statement of the way in which the theory of transmigration should be used by an author. He says that the author of Sheppard Lee has failed in his use of the principle, because "a confused and jarring system of transmigration,"[17] which is the basis of the novel, is not justified. "All deviations, especially the wide ones, from nature, should be justified to the author by some specific object . . ."[18] This indicates that Poe had no real belief in the doctrine of transmigration, but was interested in the theory because of its value to him in writing stories, five of which use the principle as a basis.[19]

Poe's interest in metaphysical ideas finds further expression in two stories and in at least one poem. In these selections he speaks of life after death, and speculates concerning the region which lies just between the land of the living and the land of the dead. "The Colloquy of Monos and Una" contains a conversation between two spirits who have been some time in the region of the dead. Monos explains to Una the meaning of the term "born again."

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[17] Ibid., Vol. IX, p. 138. [18] Ibid.

[19] This has been noted by William Mentzel Forrest, Biblical Allusions in Poe, New York, The Macmillan Co., 1928, pp. 27, 69.

To go through a re-birth, Monos says, one must die and realize the meaning of death. Death is not the end of life, but it is the beginning of a period of eternity in which there is happiness. The journey to the land of eternity, or the passage through death, is described by Monos in the following passage:

> I breathed no longer. The pulses were still. The heart had ceased to beat. Volition had not departed, but was powerless. The senses were unusually active, although eccentrically so--assuming often each other's functions at random. The taste and the smell were inextricably confounded, and became one sentiment, abnormal and intense. . . . All my perceptions were purely sensual. The materials furnished the passive brain by the senses were not in the least degree wrought into shape by the deceased understanding. Of pain there was some little; of pleasure there was much; but of moral pain or pleasure none at all.[20]

The increasing acuteness of the senses possessed by Monos in dying found its climax in a clear perception of "man's abstract idea of Time."[21] As the days and years passed after the decay of his earthly body, Monos became acutely conscious of being, then of "the Autocrats Place and Time."[22] The region of the dead is not described with great clarity, nor is the place separating life from death clearly defined. The whole is presented with a vague and shadowy outline. It is clear only that death brings no great pain and that, with complete cessation of the bodily powers, there comes a

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[20] Works, Vol. IV, p. 206. [21] Ibid., p. 209.

[22] Ibid., p. 211.

realization of the meaning of eternity.

In "Mesmeric Revelation" Poe attempts to describe the land of the dead with greater detail than he uses in "The Colloquy of Monos and Una." Based on the idea that a person in the mesmeric condition is able to perceive matters far beyond the perception of the physical organs, the story offers for consideration a conversation between a dying man, Mr. Vankirk, and Poe, who acts as the hypnotist.[23] Vankirk is placed under the mesmeric influence at his own request, and he attempts to answer questions concerning the nature of death and of God. He states that death has no terrors for him because the peace of the mesmeric trance closely resembles death itself. Talking from the region of spirits beyond the land of the living, Vankirk elaborates the theory that God is neither spirit nor matter, for in the land of the dead there is no such thing as immateriality. "But there are gradations of matter of which man knows nothing; the grosser impelling the finer, the finer pervading the grosser. . . . These gradations of matter increase in rarity or fineness, until we arrive at a matter unparticled--without particles--indivisible--one; and here the law of impulsion and permeation is modified."[24] This unparticled matter in the land of the dead is the thought or mind of God; all created things are thoughts of God given corporate form.

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[23]See a discussion of this story under Mesmerism, Chapter VII.

[24]Works, Vol. V, p. 245.

Apparently the spirit of man, after death, loses its corporate form and returns to the unparticled matter of the universe, which in its essence is God himself. In this return to unparticled matter, there is throughout eternity particular bliss, the basis of which is the life on earth. Poe apparently makes an attempt to explain the mystery of life after death, identifying God as a type of matter without particle, to which all living beings return after death.[25]

In "Al Aaraaf" Poe presents an idea of life after death that seems to be the same as that enjoyed by the spirits of the land described in "The Colloquy of Monos and Una." In the poem the life on the other side of death is described; in the story the journey to the land beyond death receives attention. Al Aaraaf is a star[26] that exists as a land of peace and happiness near the region of heaven. The inhabitants of the star are ignorant of good and evil, and the happiness that they experience is "like the sensuous luxuriance one might find on Earth."[27] "Sorrow is not excluded from Al Aaraaf, but it is that sorrow which the living learn to cherish for the dead, and which, in some minds,

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[25]Compare this with the ideas in Eureka concerning the origin of the universe, this Chapter.

[26]See the discussion of this poem under Astronomy, Chapter III.

[27]Floyd Stovall, "An Interpretation of Poe's 'Al Aaraaf'," p. 119.

resembles the delirium of opium."[28] All those who enter the region of Al Aaraaf are subject to the commands of the queen Nesace, who follows the bidding of God in sending messages throughout the universe.[29] The spirits of the star seem to be capable of feeling the true meaning of eternity,[30] which is one of the results of death as described in "The Colloquy of Monos and Una." Thus it appears that through death, and during residence in a land after death located on a moving star, the spirit of man may attain greater knowledge and comprehension of the spiritual matters that lie beyond mortal understanding.

The eternal life presented in "Al Aaraaf" is different from that of which Poe takes notice in a criticism of Zanoni, A Novel. In this book the author presents a hero who has solved the problem of immortality by learning how to prolong indefinitely his existence on earth. He is able to achieve eternal life on earth before he dies. Poe explains the principle of the novel in the following passage:

> The idea of the novel is borrowed from the dreams of the Old Rosicrucians, and of the predecessors of the sect as far back as the old Chaldeans. These visionaries imagined that man, by a rigid practice of virtue and the sublimation of every earthly feeling,

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[28] Works, Vol. VII, Footnote, p. 36.

[29] Ibid., p. 39.

[30] For a discussion of Poe's poem see Floyd Stovall, op. cit., and Richard Campbell and Marie Morgan Pettigrew, "Reply to Floyd Stovall's Interpretation of 'Al Aaraaf'."

> could attain to a perfect comprehension of the most hidden secrets of nature--could hold communion with, and exercise control over, the unseen powers of the air--and could even preserve human life to an indefinite extent, by acquiring the means by which it might be perpetually renovated.[31]

This renovation of life is achieved by "the subjugation of every feeling and emotion to the mastery of a Pure Intellect."[32] Poe does not state that he accepts the theory upon which the story is based; he justifies its use by the author in that a story may well use imaginative materials if they add to the effect of the narrative. This shows that Poe is acquainted with the metaphysical ideas of the rosicrucians, and that he is interested in the use of these ideas in stories.

The culmination of Poe's metaphysical ideas may probably be found in the essay Eureka. Poe attempts to explain the origin of matter and the universe. In the very beginning of time, he maintains, there existed God and his will. To comprehend the nature of God and his meaning it would be necessary for man himself to become God.[33] The initial creative act of the will of God can be comprehended only through a mental process that is beyond the realm of conscious thought, a process of intuition or feeling. The thing which God originally created, "that Matter which,

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[31] Works, Vol. XI, p. 116. [32] Ibid., p. 117.

[33] Works, Vol. XVI, p. 205.

by dint of his Volition, he first made from his Spirit, or from Nihility, could have been nothing but Matter in its utmost conceivable state of . . . Simplicity."[34]

Poe explains the simplicity of matter in the following passage:

> Let us now endeavor to conceive what Matter must be, when . . . in its absolute extreme of Simplicity. Here the Reason flies at once to Imparticularity--to a particle--to one particle--a particle of one kind--of one character--of one nature--of one size--of one form--a particle, therefore, "without form and void"--a particle positively a particle at all points--a particle absolutely unique, individual, undivided, and not indivisible only because He who created it, by dint of his Will, can by an infinitely less energetic exercise of the same Will, as a matter of course, divide it.[35]

This atom of unparticled matter is that original matter out of which came the entire universe through the exercise of the will of God. By a process of diffusion, the divine power succeeded in forcing from this original atom the innumerable other atoms that became the fixed stars, the planets, and all the other heavenly bodies. The diffusive power being withdrawn from the atomic structures, they tend to go back to their original unity, the beginning particle. This tendency to return to the original unity is the operation of thelaw of gravity;[36] the power that prevents the immediate coalescence of the atoms into one

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[34] Ibid., p. 206.

[35] Ibid., p. 207. Compare with the description of Matter in "Mesmeric Revelation," this Chapter.

[36] Works, Vol. XVI, p. 212.

is the force of electricity,[37] which is generated by the efforts of the atoms to go together. Each atom being different from the others, as well in nature as in shape, their efforts at union bring about generation of a force, electricity.

These two laws of the operation of the universe, gravitation and electricity, or attraction and repulsion, are the fundamental principles which control the revolutions of the planets and the stars in their orbits. Poe identifies these two laws as the material and the spiritual forces of the universe.[38]

Poe's attempt to explain the origin of the universe is well summarized in the following passage:

> On the basis of unity as the expression of simplicity Poe posits his major hypothesis: "Oneness is a principle abundantly sufficient to account for the constitution, the existing phenomena and the plainly inevitable annihilation of at least the material universe." The purpose of God's creation of the primordial particle was the constitution of the universe, which constitution has been effected by forcing the normally One into the abnormal condition of Many. Multiplicity may be defined, therefore, as difference from unity. The phenomena of the universe arise (1) from the tendency to diffusion, by which the many arise from the one, and (2) the tendency to reaction or the tendency of the disunited particles to return to the one.[39]

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[37] Ibid.

[38] Ibid., p. 214.

[39] Margaret Alterton and Hardin Craig, Edgar Allan Poe, Representative Selections, "Introduction," p. xxxix. For further discussion of Eureka, see also George E. Woodberry, The Life of Edgar Allan Poe, Vol. II, p. 240 ff.

Poe's theory can be accepted only with great difficulty, since it is obvious that any attempt to explain those things beyond human experiment must be pure speculation. The interest that Poe shows in the explanation of life and the creation of life seems to prove that he is intensely desirous of explaining the mystery. That he confidently expects the world to accept his theory seems to be evident; it is equally evident that he is not a true scientist, for he attempts to prove metaphysical theories with scientific facts from astronomy and mathematics.[40]

In a footnote on a criticism of the poems of Halleck and Drake, Poe makes a statement that bears out the idea of Eureka, that God has always existed and that the beginning of all things can be found in the original creative act of the divine will. He says, "Imagination is, possibly in man, a lesser degree of the creative power in God. What the Deity imagines, is, but was not before."[41] If that thing which God imagines has not existed before, then it seems to follow that the beginning of all things must have been in the divine mind. In Eureka the first act in the formation of the universe was the creation of an atom, preconceived by the divine will. In this footnote Poe seems to make clear that the first atom of the universe existed, before its creation, in the imagination of God.

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[40] See Astronomy, Chapter III, and Mathematics, Chapter IV.

[41] Works, Vol. VIII, p. 283.

Poe's paramount interest in the field of metaphysics seems to be in speculation concerning the nature of God, the origin of the universe, and the relation between matter and spirit. Poe apparently believes that he has solved these problems in the essay Eureka, which is given a scientific turn by the use of astronomical and mathematical terms. Difficult as it is to accept Poe's statements, and unusual though his ideas of "unparticled matter" and the nature of God may be to the mind of the layman, it must be admitted that Poe makes a serious and intense effort to solve the mystery of creation. His interest in speculation concerning life after death, shown in two of his stories and one poem; his knowledge of the theories of the Rosicrucians, set forth in a criticism of a novel; and his interest in the doctrine of transmigration and reincarnation, which receives attention in five of his stories and one criticism, point to the conclusion that Poe has a wide interest in metaphysical theories that attempt a solution of the mystery of life and death. Though not so noticeable as his concern with metaphysical principles, his concern with theories of the working of the human mind is none the less of some importance. His speculation concerning the spirit of the perverse as a faculty of the mind, present in two of his stories; his remarks concerning the faculty of memory, contained in a criticism of "Letters to Young Ladies" and in a passage in the "Marginalia"; his attention to a peculiar monomania in "Bere-

nice"--all these indicate that he attempted to keep up with psychological theories.

CHAPTER VI

PHRENOLOGY AND ASTROLOGY

Phrenology

The study of phrenology assumed in the nineteenth century the importance of a real science. Started by Gall in Germany, phrenology was based on a "series of hypotheses in which the doctrine of the faculties was worked out in relation to cerebral anatomy."[1] Gall also believed that the development of a certain mental faculty was controlled by the growth of a certain part of the brain, and that this growth of the brain could be detected by feeling the skull, in which there should be large bumps immediately over the developed part of the brain.[2] Phrenology made a tremendous appeal to the masses of the people; lecturers went on the road to tell of the wonders of character analysis by means of the bumps in the human skull. There was little effort to establish scientifically the claims of the phrenologists; reputable men of science and education accepted the general principles of the study and openly made confessions of their belief. One historian of the period says that Elisha Barrett, "Professor of the Theory and Practice

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[1]Gardner Murphy, An Historical Introduction to Modern Psychology, p. 55.

[2]Ibid.

of Physic in the Medical Department of Transylvania University,"[3] made this statement in a letter to a friend: "I can . . . say, from study and observation, that I am well satisfied of the truth of the general principles and doctrine of the Phrenological physiology of the brain."[4] It is maintained that Horace Mann "said that a young man should spend his last dollar, if he had but one, in learning from a Phrenological examination what occupation he should pursue."[5] These observations indicate that the arguments of the phrenologists were taken with great seriousness even by learned men of the first half of the nineteenth century. As a journalist keeping pace with the subjects of great popular interest, and as a writer making every effort to acquaint himself with scientific developments, Poe became during his time fairly well informed on the study of phrenology. In his works there are several references to phrenology in which Poe attempts to maintain a scientific attitude.

"The Imp of the Perverse," in which Poe shows interest in the primary faculties of the mind,[6] contains a passage which indicates that Poe considers phrenology a real science that may aid in establishing the powers of the human mind.

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[3]E. Douglas Branch, The Sentimental Years, New York, D. Appleton-Century Co., 1934, p. 279.

[4]Ibid. [5]Ibid., p. 284.

[6]See Psychology, Chapter V.

In this story Poe says that the spirit of perverseness will be attributed by some to the phrenological faculty of combativeness.[7] "But," Poe maintains, "a glance will show the fallacy of this idea. The phrenological combativeness has for its essence, the necessity of self-defence. . . . Its principle regards our well-being; and thus the desire to be well, is excited simultaneously with its development."[8] Poe goes on to say that the spirit of the perverse does not arouse the desire to be well, but operates antagonistically to this desire. Although he contradicts what he believes will be the contention of the phrenologists, Poe clearly shows that he is acquainted with the study of phrenology.

"Some Passages in the Life of a Lion" assumes a satirical attitude toward some of the more extravagant claims of phrenology. The hero of the story gains social prominence when he succeeds in making his nose larger than that of any other person. He makes the "Science of Noses" his life study[9] and becomes the most important man in the city where he lives. Poe may mean that phrenology, represented in the story by "Nosology," has made many claims that cannot be seriously maintained. The fact that he takes the trouble to write satire on phrenology, which he discusses seriously in other stories, seems to show that Poe accepts the basic

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[7] Works, Vol. VI, p. 147.

[8] Ibid. [9] Ibid., Vol. II, p. 36.

claims of phrenology as being scientifically correct.

In "The Business Man" Poe ridicules the idea that the head of an individual can be changed by artificial means so that certain phrenological faculties will be altered. The belief that the head could be altered by external pressure received some attention from many phrenologists; Gall maintained that the phrenological faculties could not be affected by the possible changes in the shape of the head.[10] Poe was probably familiar with the more serious efforts of the phrenologists, and makes an effort in "The Business Man" to show the falsity of one of the more extravagant claims of the radical proponents of phrenology. The hero of the story receives a bump on his head when he is a very small boy. This bump, caused by his nurse's knocking his head against a bed post, "turned out to be as pretty an organ of order as one shall see on a summer's day."[11] The knock on his head when he was a small boy causes the hero to become a business man with a passion for regularity and order; he succeeds in unusual and nefarious occupations by virtue of his well developed bump of order. Poe evidently intends to show that a misplaced mental faculty, artifically developed,

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[10] Edward Hungerford, "Poe and Phrenology," American Literature, Vol. II (Nov., 1930), p. 219. Hungerford mentions Poe's satire on phrenology in "The Business Man" and "Some Passages in the Life of a Lion."

[11] Works, Vol. IV, p. 123.

cannot aid a person in the real business of life.

Poe's dislike of the pretensions of phrenology is shown by a passage in "Some Words with a Mummy." A group of scientists succeed in reviving a mummy through application of a galvanic battery;[12] in their conversation with the mummy they learn that the assumptions of phrenology were known in Egypt thousands of years before the time of Gall and Spurzheim.[13] This does not indicate that Poe has any lack of faith in phrenology itself, but it does tend to show his disapproval of the "pretensions of phrenology."[14]

Poe's regard for phrenology is perhaps best shown in his criticism of a book called "Phrenology, and the Moral Influence of Phrenology," by Mrs. L. Miles. Because he states here his belief in the scientific nature of phrenology, I quote at length from this criticism.

> Phrenology is no longer to be laughed at. It is no longer laughed at by men of common understanding. It has assumed the majesty of a science; and, as a science, ranks among the most important which can engage the attention of thinking beings--this too, whether we consider it merely as an object of speculative inquiry, or as involving consequences of the highest practical magnitude. As a study it is very extensively accredited in Germany, in France, in Scotland, and in both Americas. Some of its earliest and most violent opposers have been converted to its doctrines.[15]

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[12]See Galvanism, Chapter VII. [13]Works, Vol. VI, p. 133.

[14]Edward Hungerford, op. cit., p. 221. (Most of the examples of Poe's use of phrenology that appear in this chapter have been noted in Hungerford's article, pp. 209-231.)

[15]Works, Vol. VIII, p. 252.

Poe is quite serious in his claim that phrenology is one of the most important sciences. He believes that the study is of value in a practical as well as a speculative way. The use of phrenology in self-analysis is of the greatest importance to the individual who attempts to determine his own moral capabilities. Poe says,

> It is contended that, with proper caution, and well-directed inquiry, individuals may obtain, through the science, a perfectly accurate estimate of their own moral capabilities--and, thus instructed, will be the better fitted for a decision in regard to a choice of offices and duties in life.[16]

The phrenologists' claim that the study of the cranium would enable a person to judge his character with a great degree of accuracy seems to be the basis of Poe's statement concerning character analysis.

In the same criticism Poe lists the faculties of the mind which the author of the book regards as the main divisions of phrenology. Poe says that the faculties are divided into "Instinctive Propensities and Sentiments and Intellectual Faculties."[17] Each of these divisions of the mind is divided into a number of subdivisions. The following passage is Poe's account of the subdivisions of the mind:

> The Instinctive Propensities and Sentiments are subdivided into Domestic Relations, embracing Amativeness, Philoprogenitiveness, Inhabitiveness, and Attachment--Preservative Faculties--embracing Combativeness, Destructiveness, Gustativeness--Prudential Sentiments, embracing Acquisitiveness, Secretiveness, and Cautiousness--Regulating Powers, including Self-Esteem, Love

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[16] Ibid., p. 253.

[17] Ibid.

> of Approbation, Conscientiousness, and Firmness--Imaginative Faculties, containing Hope, Ideality, and Marvellousness--and Moral Sentiments, under which head comes Benevolence, Veneration, and Imitation. The Intellectual Faculties are divided into Observing Faculties, viz: Individuality, Form, Size, Weight, Color, Order, and Number--Scientific Faculties, viz: Constructiveness, Locality, Time, and Tune--Reflecting Faculties, viz: Eventuality, Comparison, Causality, and Wit--and lastly, the Subservient Faculty, which is language.[18]

I have quoted this somewhat detailed account of the faculties of the mind because Poe believes in phrenology as a science. So far as I have been able to determine, this is the only place in Poe's works in which he attempts to list the divisions of the mind as the phrenologist sees them. It is significant to observe concerning this list that Poe thinks much could be added to the classification of the various faculties of the mind.[19]

In this criticism of a book on phrenology Poe shows that he regards the study as a genuine science that is of real value. He exhibits familiarity with the terms of phrenology and shows that he has attempted to become acquainted with the claims of phrenology concerning the human mind and its development.

Poe shows little patience with a writer who attempted to ridicule the science of phrenology. Poe himself, it must be remembered, does not ridicule phrenology, but the

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[18] Ibid., pp. 253-254. This description of the faculties of the mind follows closely the phrenological classification of the mental faculties given in the Encyclopaedia Britannica, Vol. XVII, pp. 849-851.

[19] Works, Vol. VIII, p. 254.

pretensions of phrenology that go beyond human belief. In a criticism of "Walsh's Didactics" Poe observes that it is a sorry sight to see the "energies of a scholar and an editor . . . so wickedly employed as in any attempt to throw ridicule upon a question . . . whose merits he has never examined, and of whose very nature, history, and assumptions, he is most evidently ignorant."[20] Walsh's effort to ridicule the beliefs of phrenology is the only part of the book with which Poe finds any real fault. Believing as he does that phrenology is a genuine science of the mind, Poe is unable to sympathize with an author who scornfully criticizes a subject whose principles he has apparently made little effort to learn.

Poe firmly believes that phrenology can establish the existence of certain mental faculties. In a criticism of "Letters to Young Ladies" he observes that the faculty of memory[21] is a part of each primitive faculty of the mind, and that phrenology is of assistance, in proving the point.[22] He maintains, in a review of Longfellow's "Ballads and Other Poems," that the matter of "taste" in reading and appreciating poetry has been well established by phrenology. "Not the least important service which, hereafter, mankind

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[20] Ibid., p. 329.

[21] See Psychology, Chapter V.

[22] Works, Vol. IX, p. 68.

will owe to Phrenology," he says, "may, perhaps, be recognised in an analysis of the real principles, and a digest of the resulting laws of taste."[23] "The Murders in the Rue Morgue" contains a statement concerning the importance of the constructive power of the mind. "The constructive or combining power," Poe maintains, "by which ingenuity is usually manifested, and to which the phrenologists (I believe erroneously) have assigned a separate organ, supposing it a primitive faculty, has been so frequently seen in those whose intellect bordered otherwise upon idiocy, as to have attracted observation among writers on morals."[24] It seems significant that Poe feels himself to be capable of contradicting a claim of the phrenologists. Poe evidently thinks that he is well qualified to judge the truth of phrenological statements concerning the human mind.

The "Marginalia" contains at least one reference to the subject of phrenology. Writing on the work of Dickens, Poe says, "Mr. Dickens' head must puzzle the phrenologists. The organs of ideality are small; and the conclusion of the 'Curiosity-Shop' is more truly ideal (in both phrenological senses) than any composition of equal length in the English language."[25] Poe does not attempt to explain how a writer with a small bump of ideality can write a book with an

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[23] Ibid., Vol. XI, p. 83. [24] Ibid., Vol. IV, p. 149.

[25] Works, Vol. XVI, p. 11.

ideal conclusion. He merely notes that this characteristic of Dickens may cause some perplexity among the phrenologists.

It is probable that Poe uses phrenological terms in describing the principal characters in "The Fall of the House of Usher," "Ligeia," and "Diddling Considered as One of the Exact Sciences." One writer maintains that Usher, the hero of the first of these stories, has a nervous temperament that may be attributed to his unusually well developed faculty of ideality;[26] this same authority says that the Lady Ligeia possesses a strong faculty of love of life, and that the hero of "Diddling" is phrenologically certain to succeed in his work because he has a large bump of constructiveness. These three references to phrenological terms do not necessarily indicate Poe's acceptance of the beliefs of phrenology;[27] they are illustrations of Poe's use of material that would be interesting to his readers.

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[26]Edward Hungerford, op. cit., p. 227.

[27]Poe is not the only writer of the nineteenth century who recognized phrenology as a science, neither was he the only one to question some of the phrenologists' claims. Whitman, for example, saw something worth while in the study, though Emerson and Holmes seriously questioned the beliefs of phrenology. See Edward Hungerford, "Walt Whitman and His Chart of Bumps," American Literature, Vol. II (Jan., 1931), p. 357, for a statement of Whitman's opinion. For Emerson's view, see Edward Waldo Emerson and Waldo Emerson Forbes, Editors, Journals of Ralph Waldo Emerson, New York, Houghton Mifflin Co., 1910, Vol. IV, pp. 297-298. For Holmes' opinion of phrenology, see Oliver Wendell Holmes, Medical Essays, The Works of Oliver Wendell Holmes, New York, Houghton Mifflin Co., 1892, Vol. IX, p. 244.

Poe seems to be well acquainted with the many aspects of phrenology; he attempts to treat the subject as a genuine science that may be of great value in solving the practical problems of life and the theories of the human mind. He believes that some students of phrenology went too far in their claims, especially when they maintained that the faculties of the mind could be changed by external pressure on the head. Poe shows that he knows the various faculties of the mind as determined by the study of phrenology, and he approaches the subject with the manner of a scientist. He is careful to examine the assumptions of phrenology, and he even goes so far as to contradict certain phrenological principles and elaborate a theory of his own. Even though phrenology is not now recognized as a science of the mind, it must be admitted that by the standards of phrenology in the nineteenth century, Poe's interest in the subject marks him as something of a scientist. It is possible that Poe's concern with phrenology may be attributed to his profession as a journalist, but I am inclined to believe that he made a real effort to be scientific in the field of phrenology, and that he should not be censured for thinking that phrenology is a true science. It must be remembered that "in those American thirties and forties . . . the science of phrenology occupied a position not unlike that

of the . . . psychologies of today."[28]

Astrology

Poe's concern with the problems of phrenology is much greater than his concern with the pseudo-science of astrology. So far as I have been able to determine, he refers only twice to a belief in the control of human destiny by the heavenly bodies. The atmosphere of horror which is maintained in "Shadow, A Parable" might be attributed to the fact that "the heavens wore an aspect of ill."[29] A great pestilence which is abroad in the land of Egypt seems to be the result of numerous evil signs and portents. The words of the narrator of the story, the "Greek Oinos," give the astrological basis of the year of pestilence. "It was evident," he says, "that now had arrived the alternation of that seven hundred and ninety-fourth year when, at the entrance of Aries, the planet Jupiter is conjoined with the red ring of the terrible Saturnus. The peculiar spirit of the skies . . . made itself manifest, not only in the physical orb of the earth, but in the souls, imaginations, and meditations of mankind."[30] Poe does not show as great a trust in the claims of astrology as in the assumptions of phrenology;

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[28]Edward Hungerford, op. cit., pp. 209-210. For a consideration of other possible examples of Poe's use of phrenology, see this article, pp. 209-231.

[29]Works, Vol. II, p. 147. [30]Ibid., pp. 147-148.

neither is there any evidence that his knowledge of the principles of astrology is very extensive. In this story he uses an astrological principle, probably familiar to most of his readers, to help establish the theme of the narrative. The belief that the planet Saturn signified disease is one of the oldest astrological principles,[31] and it is not strange that Poe is familiar with it.

In an article called "Slavery in the United States" Poe expresses a belief in the theory that human history tends to repeat itself according to certain laws that are similar to the laws of the heavenly bodies. He does not say that human affairs are controlled by the courses of the stars, but he seems to think that the progress of the planets and the stars in their orbits may have some connection with the recurrence of events in the history of mankind.[32] His concern is primarily with the changes that make up human history; the astrological idea is of secondary importance.

From this survey of Poe's use of phrenological and astrological ideas it is possible to draw certain conclusions. It is evident from the more than twelve references

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[31] See The Kalendar & Compost of Shepherds, translated from the original edition published by Guy Marchant in Paris in the year 1493, and translated into English, c. 1518: newly edited for the year 1931, London, Peter Davies, 1930, p. 141.

[32] Works, Vol. VIII, pp. 266-267. This seems to be an example of Poe's use of astrology, though it is possible that Poe does not intend to use an astrological idea.

to phrenology that Poe accepts it as a definite science of the mind. He seems to know both the advantages and limitations of phrenology, and he is careful to disregard the most extravagant claims of the phrenologists. His comments on the faculties of the mind assume scientific importance when they are considered by the standards of phrenology in the nineteenth century. He uses the terms of phrenology to make his criticisms and stories more interesting to his reading public, but he is equally concerned with the problem of establishing the true phrenological faculties of the mind and determining how the study may be of benefit. Astrological ideas receive no great space in his works; the two references to this subject that I have noted indicate that Poe has only a slight interest in the problems of astrology. He makes no attempt, so far as I have been able to determine, to establish the scientific basis of astrology.

CHAPTER VII

GALVANISM AND MESMERISM

Galvanism

Early in the nineteenth century a new field of scientific research was opened up by the discovery of the galvanic battery, sometimes called the voltaic pile. This discovery "gave rise to a series of phenomena, grouped originally under the name of galvanism, which, by the efforts of many observers, were gradually brought into relation with those already grouped under the name of electricity."[1] The experiments with the galvanic battery were thus linked with developments in the field of physics. Poe's interest in scientific subjects led him to use an experiment with the galvanic battery as the basis of two stories, "Loss of Breath" and "Some Words with a Mummy."

"Loss of Breath," which is intended to be humorous, presents a hero who loses his breath in an accident and determines to go to a foreign country to live. While he is travelling on a stage coach, his fellow travellers decide that he is dead, for they are unable to detect any sign of breathing. Left at an inn by the driver of the

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[1] William Cecil Dampier Dampier-Whetham, A History of Science, New York, The Macmillan Co., 1931, p. 231.

coach, the breathless hero is bought by a surgeon, who intends to dissect the body as a scientific experiment. During the dissection of the body, the surgeon applies a galvanic battery to see what effect the electric current will have on the corpse. The surgeon and his assistant, a village apothecary, are positive that the hero is dead. "This idea," says the hero, "I endeavored to confute, kicking and plunging with all my might, and making the most ferocious contortions. . . . All, however, was attributed to the effects of a new galvanic battery. . . ."[2] This experiment with a galvanic battery may have been based on an account in the Philadelphia Public Ledger of an attempt to revive a criminal who was hanged;[3] such experiments were not at all uncommon, though none of them appeared to be successful.[4] Poe does not try to make his readers believe that a dead man can be brought to life by application of an electric current; he himself does not believe the theory has been proved. The humor in the story indicates that Poe is not very serious in his consideration of galvanism.

Poe's regard for galvanism is more serious in "Some Words with a Mummy" than it is in "Loss of Breath." A group of scientists decide to apply an electric current to

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[2]Works, Vol. II, p. 158.

[3]John Grier Varner, Edgar Allan Poe and the Philadelphia Saturday Courier, Charlottesville, Virginia, University of Virginia Press, 1933, "Introduction," p. vii.

[4]Ibid.

an Egyptian mummy that has recently been discovered. As the narrator of the story says, "The application of electricity to a Mummy three or four thousand years old at the least, was an idea, if not very sage, still sufficiently original, and we all caught at it at once."[5] Only half in earnest, the scientists proceed with their experiment. When the mummy shows signs of life they are amazed; when the mummy rises and speaks, they are horrified. The revived Egyptian rebukes the scientists for disturbing his sleep, and in his conversation with them, succeeds in proving to their satisfaction the superior quality of the Egyptian civilization. Poe neither says that he believes it is possible to revive by application of an electric current a mummy thousands of years old, nor does he ask the reader to believe it.

Mesmerism

Poe devotes more space to the principles of mesmerism than he does to experiments with the galvanic battery. Mesmerism gained prominence as a pseudo-science in the last half of the eighteenth century, when there arose in Europe a cult that believed that diseases of the human body could be healed by manipulation of a magnetic force that resides in the body of man. Anton Friedrich Mesmer was the founder of this cult, and it is from him that mesmerism, sometimes

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[5]Works, Vol. VI, pp. 120-121.

called hypnotism, received its name.[6] The principles of mesmerism were known long before the time of Mesmer, but he was the first to arouse scientific and medical interest in the subject.[7] Mesmer's belief in the curative powers of human magnetism was investigated by leading scientific men of Europe; they admitted some of the phenomena of mesmerism, but refused to establish the theory of human magnetism. In spite of the lack of a scientific basis for mesmerism, popular interest in the subject grew by leaps and bounds. In the nineteenth century people in Europe and America believed in the power of hypnotism to cure diseases. The true facts of the hypnotic phenomena were obscured by unscientific efforts to experiment with the findings of Mesmer; the role of electricity in the study of human physiology was degraded and became the instrument of charlatans and fakes.[8] Hypnotism was connected with spiritualism and phrenology; numerous doctrines of pseudo-scientific importance were developed from a superficial study of the principles of mesmerism.[9]

Poe's interest in mesmerism is shown in several of his stories. In "A Tale of the Ragged Mountains," the theme of

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[6]"Mesmer," Encyclopaedia Britannica, Vol. XV, p. 287.

[7]C. Stanford Read, "Hypnotism," Encyclopaedia Britannica, Vol. XII, p. 23.

[8]William Cecil Dampier Dampier-Whetham, op. cit., p. 326.

[9]E. Douglas Branch, The Sentimental Years, p. 361 ff.

which is the doctrine of transmigration of souls, Poe attempts to show how mesmerism may establish between two individuals an unusual communion of mind with mind, in which a mesmerist can communicate his thoughts to a subject under the mesmeric influence. Poe's hypnotist is Dr. Templeton, a physician who is a believer in the curative powers of mesmerism; the subject for the experiments with mesmerism is Augustus Bedloe, a young man who is suffering from neuralgia. Poe says that Dr. Templeton had difficulty persuading Bedloe to submit to experiments with hypnotism, but the young man finally gave his permission. Templeton's attempts to induce hypnotic sleep were at first complete failures; constant efforts were necessary to establish the magnetic relation. After the twelfth experiment, success was so complete that "the will of the patient succumbed rapidly to that of the physician, so that . . . sleep was brought about almost instantaneously, by the mere volition of the operator, even when the invalid was unaware of his presence."[10] During a walk in the mountains, Bedloe has an unusual experience, in which he passes through one of his previous incarnations. At the time Bedloe sees the vision of his previous existence, Dr. Templeton is thinking of the same incidents that Bedloe sees. These incidents are from the life of a friend of Templeton, Oldeb by name, who was killed in India. It is apparent that Bedloe's

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[10] *Works*, Vol. IV, p. 165.

vision of his previous existence is induced by the magnetic relation that has been established between him and Templeton.[11] Poe does not state positively that he believes it possible for a hypnotist to transmit his thoughts to an absent subject, but he makes the theory plausible to the reader. He does not give the scientific basis of the magnetic relation that exists between Bedloe and Templeton; he uses the principle of hypnotism to make more credible the doctrine of transmigration of souls.

In "Mesmeric Revelation" and "The Facts in the Case of M. Valdemar" Poe tells of experiments with hypnotism and death. The principal idea in these stories is that mesmerism may conquer death, or suspend for a period of time the process of disintegration. In "Mesmeric Revelation" Poe says, by way of introduction to the story, that "whatever doubt may still envelop the rationale of mesmerism, its startling facts are now almost universally admitted."[12] He adds that the phenomena of hypnotism greatly resemble the effects of death, and that a person under the hypnotic influence loses nearly all power to use "the external organs of sense, yet perceives, with keenly refined perception, and through channels supposed unknown, matters beyond the scope of the physical organs."[13] Poe admits that it is difficult to prove the

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[11] Ibid., pp. 174-175.

[12] Works, Vol. V, p. 241. [13] Ibid.

effects of hypnotism, but he states that all who doubt the existence of hypnotism are merely professional doubters. Taking the part in the story of an experienced hypnotist, Poe hypnotizes a dying friend, Mr. Vankirk. While in a hypnotic trance, Vankirk converses with Poe on the nature of life after death.[14] After a long conversation, Poe attempts to awaken Vankirk with the usual mesmeric passes. "No sooner had I done this," Poe says, "than, with a bright smile irradiating all his features, he fell back upon his pillow and expired. I noticed that in less than a minute afterward his corpse had all the stern rigidity of stone."[15] Poe gives the impression that Vankirk has been dead for some time, and that he has been speaking from the land of the dead. Poe does not fully accept the experiment as a fact of science; he believes that mesmerism may have the power to suspend death, but he is not positive. He offers the experiment as an interesting speculation on the phenomena of hypnotism.

"The Facts in the Case of M. Valdemar" contains another account of an experiment with hypnotism and death. At the beginning of the story Poe gives the basis of the incident related in the story. Because it is Poe's most definite statement concerning mesmerism and death, I quote

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[14] See the discussion of this under Metaphysics, Chapter V.

[15] Works, Vol. V, p. 254.

the entire passage.

> My attention . . . had been repeatedly drawn to the subject of Mesmerism; and, about nine months ago it occurred to me, quite suddenly, that in the series of experiments made hitherto, there had been a very remarkable and most unaccountable omission:--no person has as yet been mesmerized *in articulo mortis*. It remained to be seen, first, whether, in such condition, there existed in the patient any susceptibility to the magnetic influence; secondly, whether, if any existed, it was impaired or increased by the condition; thirdly, to what extent, or for how long a period, the encroachments of Death might be arrested by the process.[16]

These are the problems which a mesmerist attempts to solve by mesmerizing Valdemar, who is slowly dying of an incurable disease. Valdemar himself is intensely interested in the experiment; he agrees to send for the mesmerist when his physicians decide that he has but one day to live. When the time arrives, the mesmerist succeeds in putting Valdemar into a deep hypnotic sleep; questions put to Valdemar elicit the statement, "I am dying." About twelve hours after he has been placed in the mesmeric condition, Valdemar apparently dies. His body has all the characteristics of a corpse; so far as the attending physicians can determine, he is dead. They are amazed to hear Valdemar speak; all persons present are terrified by his words: "I am dead." Valdemar remains in a state of trance resembling death for nearly seven months; an attempt to awaken him from the mesmeric sleep fails. Freed, finally, from the mesmeric condition, his body dissolves into a mass of decomposed tissue. The realistic manner in which Poe describes the mesmerizing and death of Valdemar makes the

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[16] *Works*, Vol. VI, pp. 154-155.

experiment plausible even to one who does not believe in mesmerism; it is not strange that many people in Poe's time believed the story was an account of an actual experiment with hypnotism.[17] The story of Valdemar aroused intense interest wherever mesmerism was studied.

From the evidence in the stories it appears that Poe believes the experiment with mesmerism and death is possible; his words in a letter to Alexander Ramsey, of Stonehaven, Scotland, and in a passage of the "Marginalia," indicate that his experiment is not seriously intended. In the letter to Ramsey he says, "Hoax is precisely the word suited to M. Valdemar case. . . . The article was generally copied in England and is now circulating in France. Some few persons believe it--but I don't, and don't you."[18] The story of Valdemar was possible intended as a hoax, but, considered with "Mesmeric Revelation," it becomes more than a mere hoax. It assumes the importance of scientific speculation on the mysteries of mesmerism. In a passage in the "Marginalia" Poe says emphatically that "Mesmeric Revelation" is not true. I quote the entire paragraph containing this assertion:

> The Swedenborgians inform me that they have discovered all that I said in a magazine article, entitled "Mesmeric Revelation," to be absolutely true, although

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[17] See James A. Harrison, Biography, Works, Vol. I, p. 238 ff., and John H. Ingram, Edgar Allan Poe, Vol. II, p. 48.

[18] As quoted by J. H. Whitty, "Edgar A. Poe in England and Scotland," Bookman, Vol. XLIV (Sept., 1916), pp. 20-21.

> at first they were strongly inclined to doubt my veracity--a thing which, in that particular instance, I never dreamed of not doubting myself. The story is a pure fiction from beginning to end.[19]

In spite of this passage denying the truth of the mesmeric experiment in "Mesmeric Revelation," I am inclined to believe that Poe regards the theory as possible.

Poe's doubts concerning mesmerism receive brief space in a criticism of "Mary Gore" in "The Literati of New York City." "Mrs. Gore," Poe writes, "has . . . given public discourses on mesmerism, I believe, and other similar themes--matters which put to the severest test the credulity or, more properly, the faith of mankind."[20] This assertion that mesmerism is a subject that will "test the credulity" of mankind does not prove Poe's rejection of mesmerism as a whole; it indicates his lack of faith in some of the claims of the mesmerists.

Poe's regard for mesmerism as a science is stated most clearly in a criticism of a book called "Human Magnetism; Its Claim to Dispassionate Inquiry," a scientific treatise that attempted to prove the existence of mesmeric phenomena. Poe finds fault with the author's reasoning and disagrees with some of his conclusions. "Not that we do not coincide with him," Poe says, "in his general views--but that we attain (for the most part) his conclusions by different,

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[19] Works, Vol. XVI, p. 71. [20] Works, Vol. XV, p. 61.

and we hope more legitimate routes than his own. In some important points--his ideas of prevision, for example, and the curative effects of magnetism--we radically disagree. . . ."[21] In another paragraph Poe explains his statement on the curative powers of mesmerism:

> In saying above that we disagree with the author in some of his ideas of the curative effects of magnetism, we are not to be understood as disputing, in any degree, the prodigious importance of the mesmeric influence in surgical cases:--that limbs, for example, have been amputated without pain through such influence, is what we feel to be fact.[22]

It is obvious that Poe accepts mesmerism as a science that may be of benefit to mankind in a surgical way. Just how far he accepts mesmerism as a curative agent it is difficult to determine. I am inclined to believe that he sees definite medical possibilities in mesmerism, but he is uncertain as to the exact scientific status of the subject.[23]

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[21] Ibid., Vol. XII, p. 123. [22] Ibid.

[23] Both Emerson and Hawthorne, like Poe, express a lack of belief in the curative powers of mesmerism. (See Edward Waldo Emerson and Waldo Emerson Forbes, Journals of Ralph Waldo Emerson, Vol. VII, pp. 258-260. For a statement of Hawthorne's views, see Nathaniel Hawthorne, The Blithedale Romance, The Complete Works of Nathaniel Hawthorne, New York, Houghton Mifflin Co., 1883, Vol. V, p. 325.

CHAPTER VIII

LOGICAL REASONING

Crime Detection

Poe shows a great interest in the detection and solution of crime by processes of logical reasoning. "The Murders in the Rue Morgue," "The Mystery of Marie Roget," "The Purloined Letter," and "Thou Art the Man" are the stories in which Poe uses the solution of a crime as a central idea. For the first three of these stories Poe creates a detective, C. Auguste Dupin, whose power of deduction in solving crimes is a source of amazement for Dupin's friend, the narrator of the stories.

In "The Murders in the Rue Morgue" Poe prefaces Dupin's solution of a brutal murder with a statement of the powers of the human mind in work of analysis. "The mental features discoursed of as the analytical," Poe says, "are, in themselves, but little susceptible of analysis. We appreciate them only in their effects."[1] He adds that the exercise of the analytical powers of the mind is always a pleasure to the person who works in analysis, and that analysis is more than mere concentration of the mind on a particular problem, and that it goes beyond simple ingenuity. The true analyst

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[1] Works, Vol. IV, p. 146.

must "make a host of observations and inferences"[2] on the problem he has under consideration, and he is capable of imagining all the possibilities connected with the solution of the problem.

Following this discourse on the properties of mental analysis, Poe presents a murder case in which Dupin puts forth his greatest efforts to bring about a successful solution of the crime. A Madame L'Espanaye and her daughter have been found murdered. The daughter has apparently been strangled; Madame L'Espanaye's decapitated body, horribly mutilated, is found outside the apartment where she lived. These facts of the crime, together with a statement of the lack of clues reported by the police, receive the attention of Dupin and his friend in the newspaper Gazette des Tribunaux. Showing great interest in the unusual crime, Dupin proceeds to analyze the facts related in the newspaper. According to this account, several persons heard a man's voice in contention with an unintelligible voice coming from the L'Espanaye apartment a few moments before the police broke into the house. It was not possible to determine the language spoken by the unknown man. There is no back entrance to the second-floor apartment occupied by Madame L'Espanaye; the police cannot account for the escape of the man whose voice was heard. As Dupin says, after his entrance into the case, "The police are confounded by the seeming absence of motive--not for the murder itself--but for the atrocity of

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[2]Ibid., p. 148.

the murder. They are puzzled, too, by the seeming impossibility of reconciling the voices heard in contention, with the facts that no one was discovered up stairs but the assassinated Mademoiselle L'Espanaye, and that there were no means of egress without the notice of the party ascending."[3] In his examination of the L'Espanaye apartment, Dupin formulates the hypothesis that a creature of unusual agility might have climed a lightning rod, caught a shutter of a window, and swung himself into the apartment. But he decides that no human being could accomplish this feat, and that the murderer must be an ape. His solution of the crime has been ably summarized by one writer as follows:

> The newspaper accounts and the testimony of the witnesses at the examining trial furnish the data. From them Dupin selects these features: there is no motive; there is evidence of unusual agility, of superhuman strength, and of extraordinary brutality; the voice heard . . . is grotesque and from various points of view unintelligible. On the basis of this Dupin forms an hypothesis: the murderer is an ape. Next follows the process of verification with the customary search for more data and data of greater significance. Dupin finds hair not human, and searches in the pages of Cuvier. He experiments with a drawing of the woman's throat and a billet of wood. He finds the ribbon that ties the sailor's pigtail and inserts his advertisement in the newspaper. The conclusion comes in the testimony of the sailor.[4]

Dupin's solution of the crime is based on certain hypotheses which he forms from the data of the case. He proves to

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[3] Ibid., p. 168.

[4] Margaret Alterton and Hardin Craig, Edgar Allan Poe, Representative Selections, "Introduction," p. ci.

his own satisfaction that entrance could be obtained to the murder room through a window that was apparently locked from within. The window is fastened by a nail which is really in two pieces; the head of the nail is imbedded in the sash of the window and the point is broken off. The hair which he finds in the clenched hand of Madame L'Espanaye he determines is from an ape; the ribbon he finds at the bottom of the lightning rod is one which only a sailor would wear. These facts, together with the description of the voices heard in the L'Espanaye apartment, lead him to the hypothesis that the murderer is an ape owned by a sailor. The unintelligible voice heard by the police was that of the ape; the other voice was that of the sailor. Proceeding from this theory, Dupin locates the sailor and succeeds in establishing the proof of his solution of the crime. He emphasizes the fact that this solution is based on seemingly irrelevant and contradictory facts; he forms a hypothesis and proceeds by reasoning to prove the truth of his theory.

In "The Mystery of Marie Roget" Dupin solves another murder that is as baffling to the police as the crime in "The Murders in the Rue Morgue." Basing the story on a murder that occurred in New York[5] but placing it in Paris, Poe presents a long and rather complicated mystery in which Dupin exercises his powers of deduction, this time at the

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[5] Works, Vol. V, Note 1, p. 1.

special request of the prefect of police. From the police records and the newspapers Dupin learns the following facts: (1) On a Sunday morning Marie Roget left home to spend the day with an aunt, telling her suitor, Monsieur Jacques St. Eustache, to call for her at dusk; (2) St. Eustache failed to keep his appointment with Marie because of a sudden rain, and supposed that she would spend the night with her aunt; (3) Four days later, on Wednesday, a Monsieur Beauvais, with a friend, identified a corpse found in the river as that of Marie; (4) The condition of the corpse indicated that the girl was strangled and then thrown in the river.[6] In his investigation of the case Dupin learns that a Madame Deluc has reported that her two small boys found a petticoat and several other articles of feminine apparel in a thicket near the river. These garments are identified as belonging to Marie Roget. The newspapers cast doubt on the identity of the corpse and attempt to prove that the girl was murdered by a gang of ruffians. Analyzing with great care all the known facts of the crime, Dupin assumes and later proves that the corpse found in the river is that of Marie Roget; that the supposed gang could not have committed the crime; that Marie had disappeared three years before in an affair with a naval officer; that the articles of wearing apparel found in the thicket were placed there shortly before they were found; and that Marie was seen,

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[6] Ibid., pp. 8-11.

on the Sunday she disappeared, in the company of a man of dark complexion. With these items as a basis, Dupin forms a hypothesis: Marie Roget was murdered by a single man, probably the unknown naval officer of Marie's first disappearance; Marie's body was thrown into the river from a boat; after disposing of the body, the murderer cast the boat adrift on the river; the boat was picked up and towed to shore; the murderer, fearing identification of the boat, stole it from the place where it was tied.[7] Dupin believes that location of the boat will lead to the speedy arrest of the murderer. Subsequent activities of the police, acting on the information furnished by Dupin, prove that the solution of the crime is practically complete.

Poe states in the conclusion of the story that he does not mean to draw a strict parallel between the murder which occurred in New York and the case of Marie Roget. The editor's note at the beginning of the story points out that the mystery of Mary Rogers' death in New York was finally solved along the lines by which the murder of Marie Roget is determined. This shows that Poe's reasoning in the story is the type which might readily lend itself to the solution of crime.

In "The Purloined Letter" Dupin solves a mystery that is different from the crimes in "The Murders in the Rue Morgue" and "The Mystery of Marie Roget." A Lady of the

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[7] Ibid., pp. 60-64.

French royal family has lost by theft a letter which if made public would ruin her socially and politically. She knows that a certain government minister is the thief, for he obtained the letter by a trick in her presence. She offers the prefect of police an immense reward if he can succeed in getting the letter from the minister. Being unable to locate the letter after thoroughly ransacking the minister's hotel, the prefect goes to Dupin for advice, which is that he make a "a thorough re-search of the premises"[8] of the minister's hotel. Dupin notes that the mystery of the letter's concealment may be baffling through its sheer simplicity. During a visit to the minister, he carefully scrutinizes the room in which the minister has his desk. Dupin notes a letter, carelessly displayed in a wall rack, which he decides is the one that has been stolen. By a clever trick he gets possession of the letter and leaves a facsimile in its place so that the minister will not immediately detect the loss. For the return of the letter Dupin receives from the prefect of police a check for fifty thousand francs. Dupin's reasoning in his solution of the mystery goes beyond his analysis of detail that he uses in solving crimes of violence. Knowing the minister to be a man of keen intellect, Dupin tries to reason as the minister would. Identifying himself in this way with the minister, Dupin decides that the letter has not been concealed. He

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[8] Works, Vol. VI, p. 37.

says that a mere mathematician would be incapable of the reasoning employed by the minister,[9] who is both a mathematician and a poet. Because of this, the minister reasoned that the best way to hide the stolen letter would be to resort "to the comprehensive and sagacious expedient of not attempting to conceal it at all."[10] Consequently he placed the letter in plain view in his study, so that every visitor would be certain to see it. The very fact of its conspicuous presence removed any suspicion concerning it. In this story Poe applies logical reasoning similar to that in "The Murders in the Rue Morgue" and "The Mystery of Marie Roget," but he goes beyond these two stories by having the detective identify himself mentally with the criminal. The similarity lies in the process of reasoning by which Dupin establishes a general hypothesis and then proceeds to prove his theory by investigation and reasoning.

In one other story Poe applies reasoning to the solution of crime. Not so well known as the stories in which Dupin analyzes the crimes, "Thou Art the Man" contains an example of Poe's reasoning that is none the less worth mentioning. The narrator of the story plays the part of an amateur detective in explaining the disappearance of a wealthy old gentleman, Mr. Shuttleworthy. Charlie Goodfellow, Shuttleworthy's bosom friend, so directs the search

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[9] Ibid., p. 45.

[10] Ibid., p. 48.

for the missing man that it is established to the satisfaction of the authorities that Mr. Shuttleworthy has been murdered by his nephew, Mr. Pennifeather. Knowing that Goodfellow bears a grudge against Pennifeather, the narrator of the story becomes suspicious. Forming a hypothesis that Goodfellow is the real murderer, he institutes a diligent private search for the body of Shuttleworthy. He finds the corpse and places it in a box addressed to Goodfellow. He writes a letter, purporting to be from a wine merchant, telling Goodfellow that a box of wine is on its way. Goodfellow opens the box in the presence of a large company of friends, among whom is the narrator of the story. Goodfellow is terrified into a full confession when the corpse, made to speak through the ventriloquial ability of the narrator, says to him with emphasis: "Thou art the man!"[11] The solution of the crime is not so well planned as the work of Dupin. Poe does not say that the murderer of Shuttleworthy is discovered by a process of logical reasoning, but the amateur detective in the story proceeds to solve the crime[12] in the same general way followed by Dupin.

Logical Reasoning Unconnected with Crime

Poe uses logical reasoning to establish his points in his criticisms as well as in his short stories. In a

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[11] Works, Vol. V, p. 306.

[12] Ibid., pp. 307-308.

criticism of Longfellow Poe accuses that poet of plagiarism in certain of his poems. A writer signing himself "Outis" defends Longfellow, and in the course of his reply to Poe's charges accuses Poe of copying parts of an anonymous poem called "The Bird of the Dream" in his poem "The Raven."[13] Poe replies to Outis in a series of letters, taking the specific accusations made by Outis and disproving them one by one. After thoroughly establishing that Outis' charges of plagiarism concerning "The Raven" cannot be supported by proof, Poe demonstrates in a comparison of two poems, one by Hood and one by Aldrich, how plagiarism may be established by a process of reasoning. Pointing out fifteen marked similarities or coincidences in the two poems, Poe concludes that one of the poems must have been plagiarized from the other. "Now the chances that these fifteen coincidences . . . ," Poe says, "are merely accidental, may be estimated, possibly, as about one to one hundred millions; and any man who reasons at all, is of course grossly insulted in being called to credit them as accidental."[14] Poe reasons that one or even two coincidences might be accepted, but several coming one right after another multiply proof that one poem was taken from the other.[15] Viewing the accumulated similarities with sheer

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[13] Works, Vol. XII, pp. 51-52. [14] Ibid., p. 82.

[15] Ibid., p. 81.

logic, Poe concludes that it would be impossible to say that there has been no plagiarism in connection with the poems. He does not try to establish which poem was taken from the other; he is interested in demonstrating how plagiarism may be proved by reasoning.

In an article called "Maelzel's Chess Player" Poe applies his process of logical reasoning to the solution of a puzzle. The mystery is the method of operation of a chess player, invented by a Baron Kempelen and exhibited in the United States by Maelzel.[16] Poe discusses in detail various solutions of the chess player that have been attempted, and disproves in entirety every solution, admitting only the general principle that the chess player is not a pure machine, but is operated by a man concealed within the figure. The automaton does not always win in games of chess; Poe says that a pure machine would never fail to win and that in a game of chess it is impossible to determine in advance the moves of the game. On these observations Poe forms a hypothesis: the player is operated by a concealed human being. Pot lists seventeen different observations concerning the chess player,[17] proving by logical reasoning that his hypothesis is correct. He proceeds to establish his solution just as Dupin solves a crime; he forms a hypothesis from certain known data and then proceeds to prove the hypothesis by observation and investi-

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[16] Ibid., Vol. XIV, p. 12. [17] Ibid., pp. 25-36.

gation. Poe's solution of the chess player seems to be worthy of acceptance; one critic made the following statement concerning the article on "Maelzel's Chess Player": "We believe Mr. Poe's hypothesis in regard to this extraordinary machine is generally conceded to be the most plausible yet given."[18] This statement, made not long after Poe's death, indicates that his solution of the chess player by logical reasoning received acceptance in his own time.

In "Von Kempelen and his Discovery" Poe uses logic to make credible to his readers the pseudo-science of alchemy, by which people had long sought to make gold from the baser metals. He bases "Von Kempelen and His Discovery" on the old belief of the alchemists that lead could be turned into gold by mixing it with certain other elements. According to Poe, the story is not seriously intended, nor is the theory of alchemy to be taken as anything but part of a hoax. In a letter to Duyckinck dated March 8, 1849, Poe says of the Von Kempelen story:

> I mean it as a kind of "exercise," or experiment, in the plausible or verisimilar style. Of course, there is not one word of truth in it, from beginning to end. I thought that such a style, applied to the gold-excitement, could not fail of effect. My sincere opinion is that nine persons out of ten (even among the best-informed) will believe the quiz (provided the design does not leak out before publication) and that thus,

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[18] Review, Article VIII, of "The Works of the Late Edgar Allen Poe . . .", North American Review, Vol. LXXXVIII (Oct., 1856), p. 437.

> acting as a sudden, although of course a very temporary, check to the gold-fever, it will create a stir to some purpose.[19]

With the purpose in mind of diverting public attention from the recent discovery of gold in California, Poe wrote the story of Von Kempelen. He says in the beginning of the story that he does not have any design to look at the subject of making gold from lead "in a scientific point of view."[20] To make the new principle of making gold more plausible, Poe claims that Von Kempelen is indebted to the work of Sir Humphrey Davy for the basic idea of his discovery. Poe states that reference to the work of Davy will show that "this illustrious chemist had not only conceived the idea now in question, but had actually made no inconsiderable progress, experimentally, in the very identical analysis now so triumphantly brought to an issue by Von Kempelen."[21] The discovery of Von Kempelen's ability to make gold is made when the police arrest him on suspicion because he will not tell how he has come by a large sum of money. Von Kempelen refuses to give his formula, but it is certain that he has developed a process for making gold. "All that yet can fairly be said to be known," Poe says, "is, that 'pure gold can be made at will, and very readily, in connection with certain other substances, in kind and

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[19] Works, Vol. XVII, p. 341. [20] Ibid., Vol. VI, p. 245.

[21] Ibid., pp. 245-246.

in proportions, unknown.'"[22] Poe says that the true significance of the discovery cannot be calculated, and thinking people will soon realize that gold will have little value "beyond its intrinsic worth for manufacturing purposes."[23] Poe establishes a scientific atmosphere in the story, in spite of his assertion to the contrary, but his primary interest, as he states in his letter to Duyckinck, is to create a sensation that will divert public attention from the discovery of gold in California. He no doubt hoped to capitalize the interest in the discovery of gold in getting a market for his story. He does not believe the story himself, and he does not expect others to believe it very long.

From this survey of Poe's interest in the solution of crimes and mysteries by processes of logical reasoning, it is possible to form definite conclusions. First, the four stories devoted to crime detection indicate that Poe is skillful in forming hypotheses and proving them by assembling data. His solution of the murder of Mary Rogers in "The Mystery of Marie Roget" was later found to be substantially correct. Second, Poe's process of reasoning, when applied to mysteries unconnected with crime, is just as logical as his solution of crimes. He reduces the

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[22] Ibid., p. 253. [23] Ibid., p. 254.

solution of a puzzle or a mystery to the simple formula of examining with minute care every detail, known or suspected, connected with the case. The single story in which he uses alchemy indicates that his interest in this subject is not very great; he uses the principle of alchemy to perpetrate a hoax.

CHAPTER IX

CRYPTOGRAPHY AND GRAPHOLOGY

Cryptography

Poe's interest in cryptography is shown by the space he devotes to the subject in his magazine articles on secret writing and in his story "The Gold-Bug." In Poe's time a cryptogram was popularly believed to be "a piece of writing to which a meaning exists but is not immediately perceptible."[1] The layman of Poe's day was interested in cryptograms because they seemed to possess some supernatural and mysterious quality.[2] Popular interest in cryptography was great, but actual knowledge concerning the composition and solution of ciphers was rather limited.

In an article called "A Few Words on Secret Writing" Poe assumes the attitude of an authority on cryptography. He gives what he believes is the history of the art of secret communications and says that "means of secret intercommunication must have existed almost contemporaneously with the invention of letters."[3] He states positively that ciphers that may appear insoluble to the average person are easily subject to analysis by the student of cryptography.

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[1] William F. Friedman, "Edgar Allan Poe on Cryptography," American Literature, Vol. VIII (Nov., 1936), p. 266.

[2] Ibid. [3] Works, Vol. XIV, p. 115.

The following passage gives Poe's opinion of cryptography:

> Few persons can be made to believe that it is not quite an easy thing to invent a method of secret writing which shall baffle investigation. Yet it may be roundly asserted that human ingenuity cannot concoct a cipher which human ingenuity cannot resolve. In the facility with which such writing is deciphered, however, there exist very remarkable differences in different intellects. Often, in the case of two individuals of acknowledged equality as regards ordinary mental efforts, it will be found that, while one cannot unriddle the commonest cipher, the other will scarcely be puzzled by the most abstruse. It may be observed, generally, that in such investigations the analytic ability is very forcibly called into action . . .[4]

Poe's belief that the solution of a difficult cipher requires exercise of the analytic powers of the mind indicates that he considers a cryptogram a mystery that demands solution by logical reasoning.

Following the statement that is given above, Poe gives various methods of forming cryptograms, including a system that involves the use of a key alphabet, and says that although the ciphers formed in the different ways may appear difficult, their solution is always simple for the person who is skilled in deciphering cryptograms. Poe says that he issued a challenge to the readers of Graham's Magazine, asserting that he would solve any cryptogram sent to him. He gives a reply to his challenge sent in by a reader of Stonington, Connecticut. This reply is in the form of two cryptograms, to both of which Poe gives the solution and the key phrase.[5] He asserts that the average cipher observes some order in its composition, in that no one symbol

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[4] Ibid., p. 116.

[5] Ibid., pp. 125-127.

is used for more than one letter of the alphabet. The cryptograms sent from Stonington follow no particular order, making their solution doubly difficult. In further articles on the subject of secret writing Poe solves a cryptogram written by Dr. Chas. S. Frailey; Poe challenges all the readers of Graham's to attempt the solution of Frailey's cipher. He quotes a letter from a Mr. Tyler in which there is a cryptogram that the author declares absolutely insoluble without the key. The first of these cryptograms Poe admits is of unusual difficulty because the author has used arbitrary symbols to stand for whole words, and the language of the message is such that there is little sense to it after it is deciphered. Dr. Frailey used the longest words he could find in the dictionary in composing the message to be placed in cipher. Poe does not give the solution of the Tyler cryptogram, but states that he should have little real difficulty in attaining a solution if he were to make the attempt.[6] Tyler's cryptogram appears difficult because no letter of the alphabet is represented twice by the same symbol.

In "The Gold-Bug" Poe uses a cryptogram as the basis of the story. Legrand, the hero, finds a piece of parchment on which is written in cipher directions for locating a great treasure. According to Poe's assertions in his articles on secret writing, the cipher which Legrand solves

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[6] Ibid., pp. 147-148.

is relatively simple, in that each letter of the message is always represented by the same symbol. In his explanation of the solution of the treasure cryptogram, Legrand gives the general procedure that should be followed in solving any message written in cipher. So far as I have been able to determine, the following passage taken from Legrand's explanation is the only definite statement of Poe's method in solving cryptograms:

> "In the present case--indeed in all cases of secret writing--the first question regards the language of the cipher; for the principles of solution, so far, especially, as the more simple ciphers are concerned, depend on, and are varied by, the genius of the particular idiom. In general, there are no alternatives but experiment (directed by probabilities) of every tongue known to him who attempts the solution, until the true one be attained.[7]

Poe believes that the determination of the language employed is the most important thing in the solution of cryptograms. This may be accomplished by experiment, which is also the general principle to be followed in the actual unriddling of the cipher.

It is clear that Poe believes himself to be quite an authority on the subject of cryptography. At least two critics agree that Poe was unusually successful in inventing and solving methods of secret writing;[8] the most recent

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[7] Ibid., Vol. V, p. 132.

[8] See F. Dredd, "Poe and Secret Writing," Bookman, Vol. XXVIII (Jan., 1909), pp. 450-451; and an anonymous article, "Edgar Allan Poe on Cryptography," Bookman, Vol. XVII (Mar., 1903), pp. 4-7.

investigation, however, written by a modern expert in cryptography, Mr. William F. Friedman, signal officer in the War Department of the United States, disproves many of Poe's statements. Poe's contention that no cipher could be invented which would be absolutely insoluble is contradicted. "There has never been any question," says Friedman, "about the theoretical possibility of constructing at least one or two cipher systems which are mathematically demonstrable as being absolutely indecipherable."[9] This same authority says that an expert cryptographer would have little difficulty in solving, within one or two hours, any of the cryptograms Poe gives in his articles on secret writing and in "The Gold-Bug."[10] "The serious student of cryptography," he says, "is driven to the conclusion that Poe was only a dabbler in cryptography. At the same time it is only fair to say that as compared with the vast majority of other persons of his time in this or in foreign countries, his knowledge of the subject, as an amateur, was sufficient to warrant notice. Had he had opportunity to make cryptography a vocation, there is no doubt that he would have gone far in the profession."[11]

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[9] William F. Friedman, op. cit., p. 279.

[10] Ibid., pp. 271,273,277.

[11] Ibid., p. 280.

Graphology

Poe's use of the art of cryptography is more impressive than his use of autography, the term which he uses to designate graphology, "the art or science of inferring a person's character, disposition, and aptitudes from the peculiarities of his handwriting."[12] Autography is concerned primarily with the signature of an individual; it does not properly include the determination of character from handwriting.[13] Poe's work with this subject is divided into two parts, an article called "Autography" and a longer selection called "A Chapter on Autography."

In the first of these two selections Poe attempts a character analysis of twenty-six famous people, nearly all of them among the literary figures of his day. He quotes letters which are supposed to be from the individuals whose characters are described. Concerning the writing of James Fenimore Cooper, Poe says, "Mr. Cooper's MS. is bad--very bad. There is no distinctive character about it, and it appears to be unformed."[14] Of the signature of Fitz-Greene Halleck Poe makes this observation: "Mr. Halleck's is a free, mercantile hand, and evinces a love for the graceful

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[12] A New English Dictionary on Historical Principles, Vol. IV, Part II, p. 360.

[13] Ibid., Vol. I, Part I, p. 574.

[14] Works, Vol. XV, p. 148.

rather than picturesque. There is some force, too, in its expression."[15] Washington Irving receives the following comment at Poe's hands: "Mr. Irving's hand writing is common-place. There is nothing indicative of genius about it. Neither could any one suspect, from such penmanship, a high finish in the author's compositions."[16] These passages, which I have quoted because they concern people who are better known today than the other individuals about whom Poe writes, are representative of Poe's attempts at character analysis in his first article on handwriting. Of this article he says at a later date[17] that the letters quoted are all fictitious, and that "qualities were often attributed to individuals, which were not so much indicated by their handwriting, as suggested by the spleen of the commentator."[18] He acknowledges that much said in the first article is not necessarily true, but he adds that "none but the unreflecting"[19] will deny that there generally exists a strong analogy between the handwriting of an individual and his character.

"A Chapter on Autography" contains Poe's views on more than one hundred of the literary figures of his day. He repeats many of the character analyses given in his

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[15] Ibid., p. 150. [16] Ibid., pp. 153-154.

[17] The first article, "Autography," was published in February, 1836; the article called "A Chapter on Autography" appeared in November, 1841. Works, Vol. XV, pp. 139, 175.

[18] Works, Vol. XV, p. 178. [19] Ibid.

article "Autography." His purpose in this second article is stated as follows:

> Our design is threefold:--In the first place, seriously to illustrate our position that the mental features are indicated (with certain exceptions) by the handwriting; secondly, to indulge in a little literary gossip; and, thirdly, to furnish our readers with a more accurate and at the same time a more general collection of the autographs of our literati than is to be found elsewhere.[20]

From the comments that Poe makes on the writers of his day, it is evident that the second of these purposes is really of the greatest importance to the author. He pretends to criticize the various writers by their handwriting, but he does not always limit himself to the handwriting as an indication of character; he criticizes the work of some writers without referring specifically to their autographs. What he does say of the individual characters as shown by handwriting seems to be drawn as much from the author's knowledge of the persons described as from their handwriting. Poe does not make "A Chapter on Autography" a purely scientific attempt to determine character by handwriting; he is satisfied if he has made a few observations concerning the handwriting of an individual that might coincide with the real character of the person.

"An Appendix of Autographs"[21] contains Poe's views on nineteen writers who are not included in "A Chapter on Autography." He follows in this article the same general

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[20] Ibid.

[21] Ibid., pp. 246-261.

plan used in "A Chapter on Autography." He is concerned primarily with literary criticism, and the problem of character analysis by handwriting is of secondary importance. In the "Marginalia" is a passage which gives a clear statement of Poe's opinion of graphology:

> I am far more than half serious in all that I have ever said about manuscript, as affording indication of character.
>
> The general proposition is unquestionable--that the mental qualities will have a tendency to impress the MS. The difficulty lies in the comparison of this tendency, as a mathematical force, with the forces of the various disturbing influences of mere circumstance. But--given a man's purely physical biography, with his MS., and the moral biography may be deduced.[22]

This is Poe's true opinion on the subject--that handwriting, together with facts of a person's physical biography, may be taken as a certain indication of character. He does not give the theory of handwriting upon which he bases his numerous deductions in the articles on autography. He adds that most of his estimates of character from handwriting are general rather than specific. There are certain types of manuscript which usually belong to individuals of a certain nature.[23]

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[22] Ibid., Vol. XVI, p. 18.

[23] Ibid., p. 19.

CHAPTER X

CONCLUSIONS

The numerous references which Poe makes to various subjects of scientific importance do not prove that he was a scientist. In his works there are at least fifteen references taken from medicine; he mentions certain gases or chemical terms no less than nine times; he uses items that may be classified biologically in at least twenty-five places. These items of scientific knowledge, though numerous when considered together, are too scattered and random to be taken as evidence of genuine scientific erudition in the fields of medicine, chemistry, and biology.

The various allusions which he makes to physics, astronomy, and navigation indicate that he had some definite scientific information in these subjects. I have shown that he refers to the science of navigation or some related idea at least four times; that he makes use of various astronomical facts and data no less than eight times; and that he in five instances refers to certain principles of physics. With the possible exception of Eureka, he does not attempt to take a scientific viewpoint in any article or story that contains an idea from navigation, astronomy, or physics.

I have shown that Poe refers to various inventions

and their development eighteen times; that he mentions six times certain mathematical formulas and principles; that he mentions principles of engineering two times; and that he dwells upon aeronautics and ballooning in at least five stories. It is obvious that, with the exception of mathematics, he has little scientific information in these four fields.

The fact that Poe uses items of scientific knowledge in his critical reviews as well as in his stories indicates that his interest in science is real rather than assumed, and that the various fields of science held a fascination for him which he could not well resist. This seems to be a contradiction of the attitude toward science which he expresses in his poem "Sonnet--To Science," in which he maintains that science hinders the work of the poet and the imaginative writer.[1] This apparent contradiction may be explained, I believe, by the use which Poe makes of science. Though he probably endeavored to keep up with the progress of the various fields of science, he rarely is able to maintain a scientific attitude when he uses items of scientific knowledge. He is a skillful journalist who makes every effort to use every item of scientific knowledge that might be of interest to the reading public. All of the stories and articles that contain scientific information, with the exception of Eureka, are written with the conscious purpose

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[1]Works, Vol. VII, p. 22.

of catching the interest and attention of the reader; scientific investigation is not the primary problem.

Poe's attention to various subjects which I have classified as pseudo-science indicates that his interest was not confined to subjects of recognized scientific importance. His concern with the metaphysical problem of the nature of God and the relation between matter and spirit shows his interest in problems beyond the limits of scientific investigation. In Eureka he makes a serious effort to solve the mystery of creation and to explain the relation between God and the universe. In two of his stories and one poem he speculates on the nature of life after death; in five stories and one critical essay he speaks of the doctrine of transmigration. This use of metaphysical theories indicates that he has a deep interest in problems of metaphysics. The five references in his works to problems of psychology indicate that he made a serious attempt to keep up with the discoveries in this field. His speculation on the faculties of the human mind can hardly be taken seriously, for the study of psychology was not recognized as a real science in the nineteenth century. He attempts to deal in a scientific way with problems that are even in the twentieth century, with the exception of psychology, beyond the bounds of recognized scientific investigation.

It is evident from the more than twelve references which he makes to phrenology that he accepts it as a definite

science of the human mind. He seems to know both the advantages and limitations of phrenology, and he is careful to disregard the most extravagant claims of the phrenologists. His comments on the faculties of the mind assume scientific importance when they are considered by the standards of phrenology in the nineteenth century. He uses the terms of phrenology to make his criticisms and stories more interesting to his reading public, but he is equally concerned with establishing the true phrenological faculties of the mind and determining how the study may be of benefit. Poe's interest in the study of astrology, illustrated by only two references to the subject, seems to be slight. He does not think that astrology has a scientific basis.

It is evident from his treatment of galvanism that he does not think the subject can be taken very seriously. The stories in which he tells of reviving a corpse, and a mummy thousands of years old, by application of an electric current show clearly that he does not believe the claims of galvanism. He thinks that there may be some connection between mesmerism and death; the evidence in "Mesmeric Revelation" and "The Facts in the Case of M. Valdemar" show that he regards mesmerism as an aid in studying the phenomena of death. He is cautious in his endorsement of mesmerism as a science; he does not know just how far mesmerism may be trusted to fulfill the claims made for it. He thinks mesmerism may be of value as an anesthetic in surgery,

but he doubts that mesmerism can be used in curing many diseases.

Poe's use of logical reasoning assumes scientific importance when it is considered that he uses it in stories and criticisms, and essays on the composition of poetry. In his four detective stories he shows his skill in forming hypotheses and proving them by assembling data. His process of reasoning is just as logical when applied to mysteries unconnected with crime. He reduces the solution of a puzzle to the simple formula of examining with minute care every detail, known or suspected, connected with the case. In "The Philosophy of Composition," though the process of reasoning does not consist of the formation and proof of a hypothesis, he tells with pure logic the steps which should be followed in composing a poem.[2] He reduces the composition of a work of art to a system that appears mechanical. This fact shows that Poe's mind must have been broad in its grasp of logic; it is difficult to believe that Poe used almost the same process of reasoning in solving the mystery of the murder of Mary Rogers that he used in composing "The Raven." But such is the case, if one may believe Poe's own analysis of that poem, and it stands as proof of his ability to reason.

Poe's use of graphology and cryptography serves as further proof of his wide range of interests. His work with cryptography shows that he considers himself something

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[2]Works, Vol. XIV, pp. 195-208.

of an authority on the subject, but investigation has shown that his knowledge goes little beyond a superficial grasp of the principles of cryptography. He believes that handwriting may afford some indication of the character of an individual. His concern with character analysis is prompted by his desire to criticize the literary figures of his day. In his treatment of both cryptography and graphology he attempts to be scientific, but succeeds in attaining only a pseudo-scientific importance.

The wide range of Poe's interests and the magnitude of his information on many different subjects has received little attention. I do not think that Poe was a scientist in any field, but I do believe that he was interested in nearly every conceiveable subject that even approached scientific importance. He was not concerned primarily with establishing facts and figures; his attention nearly always was to the journalistic value of a subject. If he could seem erudite and learned while writing for the public, then so much the better for him. That much of his information is probably incorrect is not of great importance. The important fact is that Poe kept up with the advance of knowledge in many different fields of nineteenth century investigation and study. The numerous references in his works to the subjects listed in this study show that Poe was definitely a man of his own time who had a restless and

inquisitive mind, constantly seeking new and varied information. Whatever mistakes he may have made in taking information from the works of others without giving proper credit, may be excused, I believe, by the numerous uses to which he puts various items of knowledge. It must be remembered that most of his work was probably produced with the conscious purpose of success as a magazine journalist,[3] and that "he deliberately set out to appeal to the magazine-reading public of his day by giving it exactly the type of tale already popular."[4]

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[3] Percy H. Boynton, "Poe and Journalism," English Journal, Vol. XXI (May, 1932), p. 346.

[4] Napier Wilt, "Poe's Attitude toward His Tales: A New Document," Modern Philology, Vol. XXV (Aug., 1927), p. 105.

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