A review of the diagnostic skills and therapeutic acumen of physicians in ancient times requires the availability of written records. One might argue that since the Chinese and the Sumerians introduced writing around 5000 BC, they were probably the first to make medical notes. However, there is general agreement among medical historians that the written history of medicine began in Egypt 3000 years before the Christian era with the Smith papyrus [1,2].

The Smith papyrus is the oldest medical text in existence. It is housed in a vault in the library of the New York Academy of Medicine in New York City. The Smith papyrus contains 48 case reports that are written on a thin roll of papyrus 15 feet long. The medical conditions are arranged systematically from the top of the head down to the pelvis and are discussed according to symptoms, diagnosis, treatment, and prognosis. One of the described cases is a bulging mammary tumor that was attached to the chest wall and was believed to be a malignant swelling (cancer). The report concludes with an admonition that such tumors should not be touched since treatment might prove fatal [3].

A second Egyptian papyrus, the Ebers papyrus written in 1500 BC, was destroyed in Germany during World War II. It contained descriptions of nasal, anal, and uterine polyps, and tumors of the skin, thyroid, pharynx, stomach, anus, and uterine cervix. In addition, the Ebers papyrus gave the first narrative of a soft tissue tumor, “a fatty tumor,” with the recommendation that it should be excised. However, if the tumor was large or livid and was on a limb it should remain untreated [4]. From the writings of ancient Greek and Roman physicians who studied in Alexandria, it is known that in Egypt, operable (superficial) tumors were treated by cautery with a hot iron or by excision with a knife. Ulcerated tumors were treated with mixtures of lead, sulfur, or arsenic compounds. Arsenic paste was in use in Europe and the Americas as “Egyptian ointment” until the 19th century.

By 600 BC, Greek physicians, influenced by Egyptian teachings, developed their own medical concepts and made substantial contributions to diagnosis and therapy. The most illustrious Greek physician, Hippocrates (460-375 BC) and his disciples established writing and note-taking as an important part of medicine [1,2]. Hippocrates (Fig. 1), a contemporary of Socrates (469-399 BC) and Plato (427-347 BC), was an astute diagnostician. He separated medicine from superstition and religion and made it a science for the first time. He classified diseases according to their principal symptoms and came to the conclusion that all diseases, including tumors, originate from natural causes [5]. Hippocrates noted that tumors occur mostly in elderly adults and the most aggressive growths reminded him of a moving crab. This observation led to his introduction of the terms carcinos (a tumor), carcinoma (a malignant tumor), and cancer (a nonhealing and ulcerated malignant tumor). In due course, he added another new term, scirrhus (a hard tumor) [6].

Address correspondence to Steven I. Hajdu, M.D., 1759 Drumcliff Court, Westlake Village, CA 91361-1636, USA; tel 805 496 0691; e-mail sih15@aol.com.
According to Hippocrates, tumors were caused by an imbalance of the four humors: blood, phlegm, yellow bile, and black bile. The black bile was the worst offender because it caused cancer. He recognized cancers of the skin, mouth, lips, nose, breast, stomach, and liver. He knew about anorectal and vulvovaginal condylomas and he treated them with oil of roses or cautery. Hippocrates viewed the accumulation of bloody fluid in the abdomen (ascites) as a sign of advanced cancer. To him, bloody discharges from the nipple or the uterus were worrisome because they were often caused by hidden tumors. Similarly, he noted that enlarged glands (lymph nodes) in the armpit and groin were associated with deeply located tumors.

Hippocrates recommended that benign tumors and carcinomas (superficial malignant tumors) be treated by cautery and excision. Those tumors that were not cured by cautery or the knife, were deemed incurable. For occult, ulcerated, or deep-seated cancer, he advised against treatment because if treated, the patient would soon die, whereas if the cancer was untreated, the patient might survive for years [5-7].

For eighteen centuries, writings attributed to Hippocrates appeared in handwritten copies throughout the then-known world. His collected writings were printed in book form, in Latin translation, in Rome in 1525.

After Greece became part of the Roman Empire in 146 BC, Greek physicians began to emigrate to Rome. In 46 BC, at the initiative of Julius Caesar (100-44 BC), a law was passed that granted Roman citizenship to Greek physicians who were willing to settle in Rome. Aulus Cornealius Celsus (25 BC - 50 AD), a Greek physician who had been educated in Alexandria, Egypt, took the opportunity and became a proud Roman citizen and well-known practitioner (Fig. 2). He was a prolific writer and he made Latin the language of medicine for the first time [7].

Celsus separated superficial tumors from tumors of deep organs such as the liver, spleen, and the viscera. Overall, he recommended aggressive surgical therapy for cancer. However, he treated superficial tumors by topical application of boiled cabbage, ripe figs, and a mixture of honey and egg white. Although Celsus conceded that it was difficult to distinguish inflammatory swellings and tumors, he regarded swellings in association with redness, heat, and pain as not true tumors, and he...
either treated them with scarification (incision) or allowed them to remain untreated [2,7,8].

A second famous Greek physician, who followed the path of Celsus from Greece to Rome, was Claudius Galen (AD 131-200) (Fig. 3). After he settled in Rome, he was appointed as a physician of the gladiators because of his surgical skills. Galen adopted the humorist theory of Hippocrates and strongly believed that black bile caused incurable cancer, whereas thin bile was responsible for curable cancer and other treatable tumors [9]. It is curious that Galen, a surgeon, was an advocate of limited surgery and held that the best surgeon was the one who operated only as a last resort. Despite his experience in seeing wounds and tumors at most body sites, Galen contributed little to the understanding of tumors and cancers. In treatment, he strove by purgation to prevent the accumulation of bad humors, blood, phlegm, and bile. Galen’s rigid humoral theory well suited the Romans, who had a prejudice against surgery, and the emerging Christian theology, which was against operative procedures. The cumulative impact of Galen’s erroneous assumptions prevailed for fifteen centuries [2,9,10].

In the Western Roman Empire, Rome was the center of medical knowledge. However, the collapse of Rome in AD 476 resulted in an exodus of physicians to the Eastern Roman Empire. Constantinople (now Istanbul) became a nucleus for advances in medicine [11]. Aetius of Byzantium (AD 527-565), physician to the Emperor in Constantinople, made original observations and introduced new operative techniques for tumors. He noted that cautery with a red-hot iron not only controlled excessive bleeding but also prevented the recurrence of tumors. He treated breast cancer by amputating the entire breast and advocated the complete excision of tumors regardless of their sites [10,12].

Coincident with the decline of the West and the beginning of the dark ages in Europe, the Persians consolidated their medical influence in the East. Baghdad became the center of medical...
education and several physicians came to prominence during the pre-Islamic period [13]. Oribasius of Baghdad (325-403) was one of the most noted practitioners and teachers of his time. He knew about uterine tumors such as fibroids and polyps and he was familiar with a wide spectrum of cancers at different parts of the body. In regard to treatment, he had no use for herbal remedies and he advocated early diagnosis and surgical excision of all tumors. It is notable that Oribasius knew that cancers were less painful and less red than inflammatory lesions [10].

In the post-Islamic period, Arab physicians were pressed by the authorities not to practice surgery. Against all odds, two physicians, Rhazes (860-932) (Fig. 4) and Avicenna (980-1037) (Fig. 5), continued to advance medicine and surgery, and they achieved high recognition among their peers [9,13]. In his writings, Rhazes introduced the works of Hippocrates and Galen to the expanding Arabic world. Even though he was a skillful surgeon, known for developing new operative techniques and instruments, Rhazes cautioned against surgery for cancer unless the tumor could be excised completely [2,13].

Avicenna, the most acclaimed Arabic physician, was a follower of Rhazes. He specialized in head and neck surgery, and emphasized preoperative differentiation of benign and malignant tumors. He treated benign tumors either by ligation or by excision in one step. For cancers, he introduced surgical removal in gradual steps. His technique was remembered centuries later as the first example of a multistage operation [10,12,14]. After two productive decades, Avicenna was imprisoned for practicing surgery and ultimately he was exiled from Persia [15]. Strict enforcement of the prohibition of surgery signaled the beginning of the dark ages in the post-Islamic Arabic world (Table 1).

Reflecting on this narrative, it seems that the progress made by physicians in ancient times was limited because of their own shortcomings. However, advances in medicine came to a halt as empires collapsed and religious prohibitions were strictly enforced. Meaningful progress did not take place for an additional 400 years, until the printing press was invented in 1450 in Germany, and the Renaissance movement took hold in Europe during the 14th to 17th centuries [16].

Table 1. Chronology of salient historical events.

<table>
<thead>
<tr>
<th>Year</th>
<th>Medical History</th>
<th>Year</th>
<th>World History</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 BC</td>
<td>Smith Papyrus is written</td>
<td>3000 BC</td>
<td>Construction of Stonehenge begins</td>
</tr>
<tr>
<td>1500 BC</td>
<td>Ebers Papyrus is written</td>
<td>1500 BC</td>
<td>Hebrews are in captivity in Egypt</td>
</tr>
<tr>
<td>490 BC</td>
<td>Hippocrates is born</td>
<td>490 BC</td>
<td>Battle of Marathon</td>
</tr>
<tr>
<td>25 BC</td>
<td>Celsus is born</td>
<td>30 BC</td>
<td>Cleopatra commits suicide</td>
</tr>
<tr>
<td>AD 131</td>
<td>Galen is born</td>
<td>AD 127</td>
<td>Hadrian’s Wall is erected in Britain</td>
</tr>
<tr>
<td>325</td>
<td>Oribasius is born</td>
<td>331</td>
<td>Seat of Roman Empire is moved to Constantinople</td>
</tr>
<tr>
<td>529</td>
<td>Aetius is born</td>
<td>529</td>
<td>Code of Civil Laws is issued by Justinian</td>
</tr>
<tr>
<td>860</td>
<td>Rhazes is born</td>
<td>846</td>
<td>The Arabs invade Rome and sack the Vatican</td>
</tr>
<tr>
<td>980</td>
<td>Avicenna is born</td>
<td>978</td>
<td>Cordoba, Spain, becomes Arabic military and cultural center</td>
</tr>
</tbody>
</table>
References