Health & Fitness Journal of Canada

Volume 5 **January 30, 2012** **Number 1**

NARRATIVE REVIEW

The developing understanding of Human Health and Fitness: 2. Early city life.

Roy J. Shephard[1]

Abstract

This article examines the effects upon health and fitness of a transition from a hunter-gatherer life to an agricultural and/or pastoral society. Data are considered from Simeria/Assyria/Babylonia, Egypt, Israel, India and China. In many of these regions, fertile alluvial flood plains and the development of skills in irrigation facilitated the emergence of large cities. Agricultural surpluses fostered the appearance of class structures, often with an elite ruling class, government officials, soldiers to protect and augment the new-found wealth, common labourers and slaves from subjugated territories, each with specific health and fitness needs. Occasionally the ruler was expected to demonstrate physical prowess, and the elite pursued hunting and other sports for pleasure. However, spectator sports, feasting and sedentary games brought obesity to many of the elite, with the appearance of lifestyle diseases such as atherosclerosis. Soldiers typically wore heavy clothing and carried heavy weapons, with fitness maintained by a combination of military duties and sports. Heavy occupational work was required of labourers and slaves, making it likely that they also were fit. However, this phase of history saw a gradual increase in passive transportation, and the introduction of waterpower as an early harbinger of industrial mechanization. Illness was generally attributed to offences against the gods and/or an imbalance of poorly understood body humours. Physicians emerged from the priesthood with a healing repertoire that included herbs and some forms of surgery, plus a heavy reliance on magical incantations. Only a few lone voices from this era advocated exercise for its health benefits. The Indian physician Sushruta stands out from his colleagues for recommending physical activity in the aerobic training zone.

Health & Fitness Journal of Canada 2012;5(2):27-46.

Keywords: Assyria; Babylon; China; Egypt; India; Recreation; Sedentary pursuits; Sport; Yin; Yang; Yoga

From the [1]Faculty of Physical Education & Health, University of Toronto. Correspondence: Roy J. Shephard, PO Box 521, Brackendale, BC, V0N 1H0. E-mail: royjshep@shaw.ca

Background

An initial article in this extended review of the history of health and fitness (Shephard, 2011) examined evidence on the status of hunter-gatherer societies, with particular reference to the Canadian north. It drew upon oral and written histories as well as physiological data collected on isolated populations that had maintained a traditional lifestyle. The article concluded that the survival of many tribes during prehistory had demanded periods of sustained and vigorous physical activity, and that most members of the communities concerned probably had a high level of physical fitness. Moreover, *Homo Sapiens* had adapted genetically to this type of lifestyle over the centuries, and many of the chronic diseases prevalent in our post-industrial civilization reflected failure of the current generation to meet an innate need for vigorous physical activity. In this second segment of our historical account, we examine developments associated

with the growth of substantial cities, as exemplified by the Sumerians, Babylonians, Assyrians, Israelites, Indians and Chinese. We consider changes in the economy, and thus the need for heavy occupational work, the development of sports and recreation, and emerging concepts of health and fitness.

The growing wealth of city-states, associated with advances in agricultural technology, allowed the appearance of various class structures, usually with a leisured elite. The small communities of prehistory had recognized the guidance of Shamans and elders, but they had been relatively egalitarian (Salter 1971). Now, as settlements became larger and more permanent (Garnsey, 1999), class distinctions appeared: masters and/or priests, servants and slaves, each with their particular health and fitness needs. We see the leisured classes and the military engaged in physical activities primarily for their hedonistic value or in order to enhance their fitness for war. Times of plenty also allowed eating to excess, and an interest in long-lasting sedentary games. Finally, measures were developed to control illness and in some cases to enhance health, including the consumption of herbal remedies, consultation with physicians, priests or sorcerers who could relieve anxiety and chase evil spirits, and the introduction of legislation governing diet and personal cleanliness.

With the growth of writing skills, evidence on these various issues can be sought in both contemporary literature and artifacts, although the mummified remains of Egyptian and Indian royalty provide the only objective evidence on health and disease. Unfortunately, our limited understanding of many of the languages of the ancient world remains a significant barrier. Interpretation of many of the ancient hieroglyphs is still quite controversial and has been attempted by only a few eminent middle-eastern scholars (Woodward, 2008). Information on this period in human history has considerable importance to our overall understanding of the developing understanding of health and fitness. However, both manuscripts and artifacts are located mainly in either the Middle East or in the cellars of the British Museum and the Louvre,; perhaps for this reason the input of Canadian sports historians has been quite limited, Howell (197), Mutimer (1970), Salter (1971) and Ziegler (1972) being notable exceptions to this generalization.

Sumerian, Assyrian and Babylonian Eras

Civilizations. The Sumerians were the first of several advanced civilizations to establish themselves on the rich alluvial flood plains of the Tigris and Euphrates, introducing the skills of irrigation (Hill 1984). As the art of mixing tin with copper was perfected, the Chalcolithic (copper) era (5300-4100 BCE) was succeeded by the bronze age Uruk period. This continued until a growing salinity of the soil and poor grain crops contributed to the rise of the Babylonians, about 1750 BCE (Thompson and Hay 2004).

Hammurabi (ca. 1795 - 1750 BCE) built the Babylonian empire from the ancient city states of Sumeria. He retained the Akkadian and Sumerian languages, along with many features of Sumerian society, enlarging the temples, strengthening city walls and constructing such exotic structures as the “hanging gardens” of Babylon (van de Mieroop, 2005). The city of Babylon in its turn was conquered by the Persian armies of Cyrus (538 BCE) (Smith, 1975) and this

civilization continued until 323 BCE, when the region fell to Macedonia under Alexander the Great.

Assyria (2400 to 612 BCE) was based on the cities of Assur and later Nineveh. It initially occupied the northern part of Mesopotamia, and was in frequent conflict with the Sumerians and the Babylonians. It gained progressively in power and political importance, to become the dominant regional force from about 1300 to around 600 BCE, when the entire region became subject to Cyrus II and the Persians (Olmstead, 1923).

Economy. The city states of Sumeria and Babylon were organized around a massive temple, or Ziggurat (Chadwick, 1992). A pantheon of animal gods points to the pastoral ancestry of these peoples. The economy was predominantly agricultural, although fish and fowl enhanced the diet. The social elite comprised the kings and priests, plus warriors that protected the temples. A small middle-class of merchants and craftsmen produced artifacts for the temples, but the bulk of the population were either servants or slaves of the ruling class (Murphy et al., 1992).

The city-state structure predisposed to frequent regional battles. The majority of the soldiers served as infantry. Figurines show them wearing copper helmets and heavy cloaks, as well as carrying battle-axes, daggers and spears. However, there were also bands of archers, and some "mechanized" units, equipped with two wheel chariots drawn by onagers.

Invention of the plough allowed cultivation of a wide range of crops, including barley, chickpeas, lentils, millet, wheat, turnips, dates, onions, garlic, lettuce, leeks and mustard (Sayce, 1908; Tannahill, 1968). Many agricultural tasks demanded stamina and strength. At times, use of a mattock was required, and three-person teams engaged in the manual reaping, binding and stacking of sheaves at harvest time (Kranzberg and Gies, 1975). Other duties of the slaves (women as well as men) included weaving, the pressing and milling of grain, the carrying of heavy loads, the building of both baked-mud houses and massive temples and the construction and maintenance of irrigation canals. Oxen provided power for the heaviest of tasks, and other modes of transportation included the donkey and boats propelled by both sails and oars.

The Assyrians were predominantly a warrior people. They shared the language and many of the customs of the Sumerians. However, they had less need for irrigation than those who were living on the arid plains around Babylon, and horse-breeding, as important factor in the success of the Assyrian army, became a major occupation (Yamada, 2000), along with the mining of metals and lumbering.

Sports and recreation. The aristocrats of Sumeria, Babylon and Assyria hunted a variety of wild beasts such as lions and elephants, sometimes importing game from Africa for this specific purpose. Often, the hunters were mounted on horseback, but sometimes they also rode in chariots. Terra-cotta plaques suggest that boxing and wrestling were popular sports in these societies, and swimming is also depicted in some Babylonian bas-reliefs (Spier, 1970). A form of polo developed, with players riding on the shoulders of a man rather than a horse (Nemet-Nejat, 1998), and a game resembling rugby football (majore) also became popular in Babylon. Fast, whirling dances entertained the elite and honoured the gods.

Resources also permitted the progressive development of sophisticated passive leisure pursuits. The leading figures in society hosted sumptuous banquets, and board games appeared, such as the Royal Game of Ur (dated to 2600 BCE), and a version of backgammon (sticks were used in place of dice until a practical die was invented by the Egyptians, around 2000 BCE). Plutarch describes Artaxerxes (465-424 BCE) as playing a board game with dice (Dryden, 1864). Chess was approved because of its ability to develop the mind. Although this game was invented in India, one of the early texts on chess is of Persian origin (Brunner, 1978).

Health. Much of the history of Sumerian and Babylonian medicine was conserved in the royal library of Asshurbanipal (668-627 BCE), in ancient Nineveh (Scurlock and Andersen, 2005). 660 medical tablets (mostly from the period 1000 to 600 BCE, but some dating back as far as 2000 BCE) were translated by scholars during the early 1920s (Thompson, 1923). These tablets offered prescriptions for specific problems such as diseases of the head and bruises, together with prognoses for some types of disorder. Detailed information can be found in Franz Köcher's "Die Babylonishce-Assyrische Medizin. (Köcher, 1980) and the 40 tablets collected and studied by Labat (1951).

The main god of healing, Gula, was often envisioned as a dog (Gibson, 1990). Gula's temples were sites for diagnosis and for conservation of medical texts. The medical care of the Sumerians was provided by the Ashipu and the Asu. The Ashipou were sorcerers; their task was to divine the offence against the gods underlying a disease, and then to drive out the evil spirit by appropriate charms and spells. The Asu, in contrast, were specialists in herbal remedies (Silva, 2010). Many of today's diseases, including fevers, neurological problems and venereal diseases were prevalent in Mesopotamia. Patients undoubtedly believed that their physicians were capable of healing them, and visits to the temple of Gula may at least have reinforced notions of health and wellness. A sick person of any rank was excused from work and even from service to the king (Avalos, 1995).

Much of Sumerian medical tradition was retained by the Babylonians, The most extensive medical text of this era originated with Esagil-kin-apli of Borsippa (Horstmanshoff et al., 2004); this physician argued that a patient history and examination would lead to an appropriate diagnosis, treatment and prognosis, and he gave clear descriptions of various medical problems including epilepsy (Stol, 1993).

Initially, Persian leaders demanded strict physical fitness of their subjects, assuring this through mandatory training programmess. Boys became state property from the age of six, when they began a regimen that included hunting, marching, riding, and javelin throwing. However, such attempts to improve strength and stamina were conceived not for their health benefits, but rather as a means of providing recruits for a succession of expansionist wars (Green, 1989; Wuest and Bucher, 1995). According to the Greek historian Strabo, during the Achaemenid period (550-330 BCE), young men were expected to develop not only physical prowess, but also a well-rounded mind, the latter being gained through instruction in the mythical elements of their culture. Prevention was conceived mainly in terms of grotesque masks that were fixed

to doors and windows in an attempt to scare away the vicious "south wind," a dog-bodied eagle that brought fever to both animals and humankind. Arad-Nana (668-626 BCE), a court physician, also warned his master "Beware of flies and shun lice in the interest of good health (Heynick, 2002)."

Hebrew accounts of the captivity (586-538 BCE)(Daniel, Chapter 5; Talmudic Megillah 11a-b) suggest increasing decadence between the rules of Nebuchadnezzar (605 – 562 BCE) and Belshazzar (the final Babylonian regent, 553-550 BCE). At this stage in history, the sensuous ease of the Babylonian aristocrats and an associated deterioration in their physical fitness probably contributed to their conquest by Cyrus and the armies of Persia.

Egyptian Civilizations

The first of the Pharaohs lived around 3100 BCE. Egyptian civilization spanned the time from the early to the late bronze age, reaching its apogee under Ramases II (who became Pharaoh in 1279 BCE). The later history of Egypt was marked by successive occupations: firstly the Assyrians (c. 671 BCE), then Alexander the Great and the Macedonians (332 BCE) and finally the Romans (30 BCE) (Breasted, 1909).

Economy. Like Sumeria, much of Egypt's wealth was dependent on the annual flooding and subsequent irrigation of land in the Nile delta. The Egyptian temples not only served as places of worship, but were also vast granaries. Most of the population were small-scale farmers, but their produce was owned by the state. The common people (together with slaves such as the Israelites) were also required to work on massive construction and irrigation projects. Artists and craftsmen were of somewhat higher social status, as were physicians, engineers and priests. Scribes and government officials formed an elite, distinguished by the wearing of white kilts (Manuelian, 1998; James, 2005).

The ordinary people lived in mud-brick huts; these had an open roof, and contained a grindstone for milling grain and a small oven (Manuelian 1998).. The main crops were cereals, harvested with a sickle, threshed with a flail, and winnowed (Murray, 2000) to make the staples of bread and beer (Samuel, 2000). Flax provided people with linen clothing, and hand-watered gardens on higher ground allowed the cultivation of other foods such as leeks, garlic, melons, squashes, pulses and lettuce (Murray 2000), together with grapes for the production of wine. Livestock included cattle, sheep, goats and pigs, along with force-fed geese, ducks and pigeons (Manuelian, 1998). Fish and honey added further variety to the diet.

Both donkeys and oxen were used as beasts of burden and for ploughing (Haudricourt and Delmarre, 1956). Under Ptolemy IV (221-205 BCE), the introduction of an ox-driven waterwheel reduced the manual energy required for irrigation and the draining of dry docks (Oleson, 2000). Horses were introduced by Asiatic invaders (the Hyskos) around 1600 BCE (Booth, 2005), but transportation by camel and elephant was a relatively late innovation; it never became widespread because grazing land was limited. Granite and limestone were quarried for massive building projects, and copper, lead and gold mining added to the wealth of the kingdom.

The military were equipped mainly with bows and arrows, spears and skin-covered shields. However, horse-drawn chariots were introduced in the New

Kingdom, about 1500 BCE, and some 6000 chariots participated in the battle of Kadesh under Ramesses II (Healy 1993).

Sports and recreation. An early "international games" may have been organized at Akhmim, in Upper Egypt in honour of the mythical Perseus (late 1200s BCE) (Touny and Wenig, 1969; Maher, 2010). Drawings and paintings show Egyptians participating in boxing, wrestling, weightlifting, archery, javelin throwing, fencing, juggling, stick fencing, box-jumping, weight-lifting, ball games, swimming, rowing and acrobatic dancing (Simri, 1966; Touny and Wenig, 1969; Mutimer, 1970; Howell, 1971; Ryan, 1974). One of the ball games from this era seems to be a version of handball, and another used bats fashioned from palm trees. Ancient texts record a number of lengthy marathons. In particular, Taharqa (who reigned from 690 to 664 BCE) instituted a 100 km race, recently revived as the "Pharaonic 100km." This extended from the Sakkara pyramids to the south-west of Cairo to the Hawara pyramid at El Faioum. Future pharaohs were also expected to excel in a 33.3 km race, and in the Heb Sed festival the current Pharaoh celebrated 30 years of rule by racing the Apis, a sacred bull on the Heb-Sed court (Breasted 1906; Murnane 1981). In one instance, this last race was run by Queen Hatshepsut (1508-1458 BCE), apparently because her spouse was no longer well enough to meet this challenge. The elite of Egyptian women also participated in some of the other activities noted above, including swimming, ball games, archery, and sacred dancing (Ziegler, 1972).

The leisured class also enjoyed a progressively growing range of sedentary pursuits. An elegant board for the game of Senet (an antecedent of draughts) was found in King Tut's tomb, and it can also be seen in hieroglyphs from around 3100 BCE; this game became so popular, it appears to have taken on a religious significance (Piccione, 1980). Egyptians credited their god Thoth with the invention of music, and instruments such as bells, cymbals, tambourines, drums, clarinets, lutes and lyres were popular accompaniments to dance spectacles at feasts given by wealthy families (Erman, 1894).

Health. The official doctors of the Egyptians belonged to the priesthood. Their training centred around the temples, which also contained vast stores of therapeutic herbs (Bettman, 1956). Some medical scholars attained quite a widespread reputation. The concepts of the most famous of these men, Imhotep (c. 2650-2599 BCE), were remarkably free of magic; he emphasized the value of anatomical observations, describing over 200 illnesses and their potential cures (Shehata 2004). Sir William Osler (1849-1919), a Canadian physician who became one of the medical founders of Johns Hopkins Hospital, described Imhotep as the father of medicine, "the first figure to stand out clearly from the mists of antiquity" (Osler, 1921). The services of the official priest-physicians were supplemented by a variety of magicians; the latter carried papyrus scrolls of incantations to drive out demons, and sometimes performed massages. The Ebers papyrus is the most extensive. It contains remedies for 700 conditions, ranging from a crocodile bite to a painful toe (von Klein, 1905).

Thanks to Egyptian skills in embalming and a dry climate, some aspects of ill-health can be glimpsed, at least for the elite of society. Many of the mummies appear to have been grossly overweight, and perhaps because the diet

had a high sugar content, periodontal disease was prominent (Filer 1996). Some of the Egyptians suffered from rheumatoid arthritis and tuberculous spinal deformities, others had bladder and kidney stones, and from the viewpoint of health promotion, a substantial proportion also suffered from advanced atherosclerosis (Ruffer, 1910a). The mummy of Menephtah, the Pharaoh of the Israelite Exodus (1280-1211 BCE) showed extensive deposits of calcium in the aorta (Shattock, 1908-1909). Ruffer (1910-1911) dissected out various arteries from mummies covering the period 1580 BCE to 525 CE, and he concluded that arteriosclerosis was as prevalent as in today's society. Radiographic studies have confirmed this view, showing vascular calcification in the mummies of Ramesses II, Ramesses III, Sethos I, Ramesses V, and Ramesses VI (Harris and Wente, 1980). Computed tomography has demonstrated lesions in 9 of 16 relatively wealthy individuals, including the nursemaid of Queen Nefertari (Allam et al., 2009). Vascular problems among the ruling elite are hardly surprising, since some dietitians have estimated that their food contained as much as 35% fat. Over-rich food was a particular problem for the priests and their families, because they ate offerings to the gods (Darby et al., 1977). It is less likely that the common people suffered from this problem, since their diet was mainly vegetarian (David et al., 2010).

Although health was regarded as a desirable state, an ancient hieroglyph suggests that it was associated with recovery from illness rather than the absence of disease. The *Adult* life expectancy of the Egyptians was very low, about 35 years for men and 30 for women (Filer, 1996).

The population set value on personal hygiene; they bathed regularly in the waters of the Nile, using a soap made from animal fat and chalk (Manuelian, 1998). Amulets were worn for their supposed value in warding off evil spirits. Moderation in diet was also commended in the wisdom teachings (Sebayt) from the Insinger Papyrus (second century CE) (Lichtheim, 2006):

The life that controls excess is a life according to a wise man's heart.

Vegetables and natron are the best foods that can be found.

Illness befalls a man because the food harms him.

He who eats too much bread will suffer illness.

He who drinks too much wine lies down in a stupor.

All kinds of ailments are in the limbs because of overeating.

He who is moderate in his manner of life, his flesh is not disturbed.

Diets rich in garlic and onions were advocated to enhance health and relieve bronchospasm. However, some meat products were prohibited at certain times of the year, and Herodotus noted that the Egyptians regarded pigs as unclean (Dawson, 1928; Rawlinson, 1942):

"The pig is regarded among them as an unclean animal, so much so that if a man in passing accidentally touch a pig, he instantly hurries to the river, and plunges in with all his clothes on. Hence, too, the swineherds, notwithstanding that they are of pure Egyptian blood, are forbidden to enter into any of the temples"

The statues of both men and women generally portray a fit physique, but in contrast pictures on some Egyptian tombs

depict sumptuous and drunken feasts, at least for the elite. Tipton argued there was scant evidence that exercise was valued in the context of either disease prevention or the enhancement of health and performance (Tipton, 2008). Loss of bodily vigour was associated rather with a putrefaction of undigested food in the intestines. Nevertheless, in the later stages of Egyptian history, following the Greek conquest, teachers such as Herophilus, the first anatomist (335 – 280 BCE) and Erasistratus, an early physiologist (304 – 250 BCE) from the medical school in Alexandria seem to have recognized the therapeutic value of moderate exercise (Adams, 1844). Thus Herophilus wrote (von Staden, 1998):

"when health is absent, wisdom cannot reveal itself, art cannot manifest, strength cannot fight, wealth becomes useless, and intelligence cannot be applied."

Unlike many of his contemporaries, Erasistratus, also, was opposed to the common therapeutic practices of blood-letting and purging. He condemned the "plethora" that was induced by an excessive intake of food and he recommended ensuring good health through hot baths, exercise, friction and a diet of simple vegetables (Smith 1982; Prioreschi 1998).

Jewish Civilizations

The first record of the term Israel is found in the city of Thebes, Egypt, on the Merneptah stele of 1209 BCE (Stager, 1998); however, it may refer to an ethnic group rather than an organized state. The Old Testament (set in written form during the rule of Solomon, 961 – 922 BCE). provides a (possibly biased) account of much of early Jewish history. The initial rulers were Judges rather than Kings (Hackett, 1998). The joint kingdom of Israel and Judah enjoyed a period of prosperity (1030 – 931 BCE) under the first of its kings (particularly Solomon). However, later monarchs were lacking in wisdom, and Israel had fallen to the Assyrians by 722 BCE. Judah continued for a period as a satellite state and olive-oil producer (Thompson, 1992), but in 586 BCE it also was subjugated and its leaders were transported to Babylon. The exiles were allowed to return to Jerusalem under Cyrus (539 BCE), and the restored kingdom was subsequently assimilated into the empire of Alexander the Great (356 – 323 BCE). The revolt against the Greeks that began with Judas the Maccabee (167 BCE) achieved renewed semi-independence (Schäfer, 2003), but this was soon terminated by the Roman conquest of Pompey (63 BCE).

Economy. The early Israelites were wandering pastoralists, but they settled in Canaan in increasing numbers over the period 1200 – 1000 BCE. Here, they adapted to life in small villages (typically less than 500 people). Most of the population were engaged in farming and herding (McNutt, 1999). In New Testament times, the Bible still contains many agricultural parables, suggesting that small-scale farming continued to underpin the economy. The terrain had features that favoured such pursuits. The "Story of Si-nuhe" (20th century BCE, (Parkinson, 1999) described Palestine as:

"a good land…Figs were in it, and grapes. It had more wine than water. Plentiful was its honey, abundant its olives. Every [kind of] fruit was on its trees. Barley was there, and emmer. There was no limit to any [kind of] cattle."

Deuteronomy 8: 7 gave a somewhat similar appraisal of economic prospects:

"For the Lord your God is bringing you into a good land, a land with flowing streams, with springs and underground waters welling up in valleys and hills, a land of wheat and barley, of vines and fig trees and pomegranates, a land of olive trees and honey, a land where you may eat bread without scarcity, where you will lack nothing, a land whose stones are iron and from whose hills you may mine copper."

Metal ploughs drawn by oxen or donkeys were used to prepare the grain fields during the rainy season, when the ground had softened. Harvesting was a largely manual task, using sickles and ploughshares, with threshing and winnowing carried out much as in neighbouring societies. The hard labour of digging cisterns and terracing the rocky hillsides allowed the cultivation of a variety of other produce: lentils, chick-peas, onions, cucumbers, melons, beans, mallow, sorrel, artichokes, dates, almonds and spices, as well as flax for making clothing and ropes. The tending of these crops demanded much back-breaking work with a hoe and a mattock. Sheep and goats were the main livestock, although a few cattle were kept in the more verdant areas of Galilee and the Transjordan. Pen-fed cattle provided luxury food for the wealthy (Amos 6: 4). Heavy manual work was also required in constructing the temple and palace of Solomon in Jerusalem and a network of military fortifications throughout the land. Conscripts were recruited and required to work on these projects for one month per year.

Goods for trading included jewelry or weapons, and ceramics. In the time of Solomon, such items seem to have been in good supply. Thus we read (I Kings 10: 24-25):

"they brought every man his present, vessels of silver, and vessels of gold, and garments, and armour, and spices, horses, and mules"

Warfare with neighbouring tribes was frequent, and most people combined the roles of farmer and soldier. Under the leadership of Joshua, a guerilla-like and tribally organized type of infantry was formed (Wood, 1998). The soldiers were lightly armed with sickle swords, spears, bows, slings, and daggers, and they proved themselves a force well-adapted to the hilly and difficult terrain (Gabriel, 2006). King David (see I Chronicles 12) introduced some specialization of roles: The Benjaminites: "*were armed with bows and could use both right hand and left hand in hurling stones and shooting arrows out of a bow*." The Gadites: "*were proficient at 'shield and buckler…and were a swift as the roes upon the mountains*." The sons of Judah & Naphtali: "*bore shield and spear*." and the Zebulunites "*were expert in war, with all instruments of war…and could keep rank*." Finally, under Solomon, a network of fortifications was built across the country (Gabriel, 2006), and squadrons of chariots supported the infantry.

Sports and recreation. Dance was used in sacred ceremonies, particularly at times of celebration and triumph. Most of the male population were also well-prepared for warfare. Running was popular, especially in the early days of the monarchy. The 1st book of Samuel (4:12) tells of a swift runner who, around 1100 BC, carried the tidings of the defeat of the Philistines over the 42 km from Aphek to the High Priest Eli in Shiloh (Vilnay,

1969). Saul and Jonathan (2 Sam 1:23), Asahel (2 Sam 2:18), Ahimaaz (18:23,27) and some of the Gadites in David's service (1 Chron 12:8) were all renowned for their speed as runners, as were those who ran before a king or a prince (1 Sam 8:11; 2 Sam 15:1; 1 Kings 1:5; 18:46). Even the Psalmist seems to have watched great runners when he pictured the sun as rejoicing like a strong man to run his course (Ps 19:5b). The New Testament also records some children's games

Other forms of sport were regarded as pagan pursuits, in part because of the participation of naked and uncircumcised men. Nevertheless, the Greek traditions of gymnasia and stadia were eventually introduced into Israel under Antiochus Epiphanes (ruler of the Seleucid empire, 175-164 BCE) and the Roman puppet ruler Herod (74 – 4 BCE), with the complicity of some Jews who sought assimilation into the foreign state. Josephus (Antiquities of the Jews, book XII, chapter V, 1) wrote:

"Menelaus and the sons of Tobias were distressed, and retired to Antiochus, and informed him, that they were desirous to leave the laws of their country, and the Jewish way of living.... and to follow the king's laws, and the Graecian way of living: wherefore they desired his permission to build them a gymnasium at Jerusalem"

Such departures from Jewish tradition were roundly condemned by the writer of Maccabees (I Macc. 1:10-15).

they built a gymnasium in Jerusalem, in the heathen fashion"

Judah Maccabee temporarily abolished all such Hellenistic practices when he gained control of Jerusalem (165 BCE) (Schäfer, 2003). By a strange irony of history, his name was later given to the Jewish sports movement. In 1921, the 12th Jewish International Congress in Karlovy Vara, Czechoslovakia, founded the Maccabi World Federation:

"*to foster physical education, belief in Jewish heritage and the Jewish nation, and to work actively for the rebuilding of our own country and for the preservation of our people"*

The first international Maccabiah Games were held in 1932, marking the 1800th anniversary of the Bar Kochba revolt against the Romans (132 CE), and the Tel Aviv facilities were named the Maccabean Stadium.

An Egyptian-type board game was discovered in Pilate's praetorium, but this seems to have been a foreign import.

Health. Israeli views on health and illness were strongly influenced both by their periods of captivity in Egypt and Babylon, and by their monotheism. There was a continuing belief in the possibility of possession by demons, and an elaboration of Egyptian dietary restrictions, but in contrast with most surrounding nations, the Jewish people saw obedience to God's laws as the route to good health:

"If thou wilt diligently harken to the voice of the Lord thy God, ...and wilt give ear to... all His statutes, I will put none of these diseases upon thee" (Exodus 15:26)

Initially, there was some disparagement of health professionals. Thus, King Asa is condemned (2 Chron 16: 12) because in the:

"ninth year of his reign was diseased in his feet, until his disease was exceeding

great: yet in his disease he sought not to the LORD, but to the physicians"

However, God's healing power and wisdom was progressively delegated to prophets such as Isaiah (Isaiah 38: 13) and Elisha (2 Kings 4: 8-17; 5: 1-14).

Rabbinic tradition suggests that the Deuteronomic statutes for the prevention of disease were first formulated by Moses (1391-1271 BCE), who probably had studied at the Egyptian medical temple of Os before leading his people to the "Promised Land." The primary emphases of these statutes were upon rigid quarantine and dietary practices, together with a regular weekly period of relaxation, enforced by complex regulations governing observance of the Sabbath.

The Old Testament underlines that the Israelites were a warrior nation, and fitness was valued mainly in this context. Abraham trained all of his household in combat, the sons of Jacob were masters of the sword, and the Judges combined life wisdom with prowess in combat; for example, Ehud Ben Gerah was a master of the dagger, Deborah the Prophetess led Israel into battle, and Samson slew the Philistines with the jawbone of an ass.

Indian Civilizations

The Bronze age Indus valley civilization, in North-west India, reached its acme in the Harrappan period, 2600-1900 BCE (Thapar, 2004). It was succeeded by the Iron age Vedic civilization, was subjugated by the Maurya Empire in the 4th and 3rd centuries BCE, and then for some 1500 years was fragmented into many prosperous Middle Kingdoms, with development of Hindu traditions during the Gupta Empire (4th century CE).

Economy. In contrast to many of the other early urban societies, there is no evidence that slavery or forced labour was used to support the elite of Harappan society. However, under the influence of Aryan invaders, the Hindus later became separated into four extremely rigid castes: Brahmins or descendants of priests); Kshatriyas (warriors); Vaishyas (merchants, farmers, and artisans); and Shudras ("untouchable" menial workers). Buddhism developed in the sixth century BCE, in part as a reaction to this caste system.

Copper, bronze, lead, and tin mines were exploited from the early days. The people of the Indus valley developed new techniques in metallurgy and produced a variety of handicrafts (statues, jewelry, ceramics and seals) using such materials as gold, bronze, terracotta, steatite (soapstone) and carneol (quartz). Farmers grew domesticated wheat and barley, peas, sesame seeds, dates, and cotton and they tended sheep, cattle pigs and water buffalo. Large cities with massive citadels and multistoried brick houses boasted an effective covered sewage system, granaries, public baths, canals and impressive dockyards, and dykes to protect against floods (Possehl, 1982; Kenoyer, 1997). Much of the transportation was by boat (both small flat-bottomed and sea-going vessels), bullock cart and elephant. In wartime, soldiers made effective use of the bow and arrow, dagger, axe and mace.

Sports and Recreation. Some early Harrapan statues depict dancers, and in subsequent Hindu tradition, a major deity (Shiva) was depicted as Nataraja, Cosmic Lord of the Dance. The archaeological discovery of a "great bath" also presupposes some interest in swimming,

and Harappan seals illustrate archers and boxers.

During the Vedic era, chariot races became popular. Both men and women engaged in ball games, and children enjoyed courtyard pursuits such as "hide and seek." Gautam Buddha himself (c 563 – 483 BCE, (Armstrong, 2001)) had considerable military training in his youth, and he is said to have been an ace at archery, chariot-racing, equitation and hammer-throwing. The practice of yoga, already apparent in the Harappan era (Possehl 2002), blossomed in the latter part of the Vedic period, and Yoga and breath control (Pranayam) became progressively integrated with traditional dance.

The Marabharata (a Sanskrit epic from the 4th century BCE) features horse riding, jumping, wrestling, judo, a fore-runner of Karate that includes the use of weapons (Kalarippayatu, (Luijendijk, 2005)) and the chasing animals. The javelin and the discus were frequently seen in the sports arenas. Lord Krishna, the supreme being of the Hindus from the 4th century BCE, wielded an impressive discus or Sudarshan chakra that was given to him by Bruhaspati, guru of the deities. Arjuna and Bhima, two of the mighty Pandavas, also excelled in archery and weightlifting respectively. Women were also trained in self-defence, and participated actively as spectators at cock, quail, and ram fights (Sherman 2002).

Archaeological excavations have yielded considerable evidence of sedentary leisure pursuits in ancient India, including early forms of chess (Murry, 1913) and draughts, pacheesi (a form of ludo), snakes and ladders, Janjifa playing cards, marbles, balls and dice.

Health. All of the Hindu gods were thought to affect health and illness, but Dhanvantari, the Avatar of Vishnu found in the Vedas and Puranas was considered as the physician of the Gods and the patron deity of medicine. In one incarnation, he appeared on earth as the king of Benares, and he taught the sages the science of medicine. Initially, illness had been viewed as a punishment for sinning, but as belief in reincarnation developed, it was thought that nature would exact retribution for the transgression. Among a collection of spells and incantations the Atharva-Veda contains references to disease, injuries, fertility, sanity, and health (Zysk, 1998). Archaeological digs have also uncovered evidence of diseases such as arteriosclerosis, osteomyelitis, cancer and dental infections (Tipton, 2008).

The earliest physicians were Brahmins, but later Vaishyas assumed this role, and the term vaidya became applied to all medical practitioners. The two most influential medical writers were Sushurata (? 800 BCE, (Saraf and Parihar, 2007)) and Charaka (born c. 300 BCE). Sushurata listed over 700 vegetable remedies, and Charaka five hundred. Of these medicaments, the best known today is Rauwolfia. The flight of birds and other sounds of nature were considered omens indicating the severity of illness, but rational empirical tests were also used in diagnosis; sweetness of the urine was regarded as a sign of diabetes mellitus, and elaborate systems were used to assess differences in the characteristics of the pulse.

The pursuit of fitness tended to be discouraged by both Hindu and Buddhist philosophy, since their emphases were upon spirituality rather than physical development. Nevertheless, physical perfection became an integral part of Hinduism, with pursuit of the body-way, or dehvada, seen as the means of realizing

one's Self. By the 15th century CE, strength, stamina and supreme control of the body functions became the keystones of Hatha Yoga, a practice introduced by Yogi Swatmarama. Meditation and physical movement were fused in an experience that suppressed all activity of the body and mind, thus allowing the self to be liberated (Radha, 2006).

For Buddhists, the suffering experienced in life was seen as due to a craving for bodily satisfactions. Relief could come only by doing away with these desires. The eight-fold path to Nirvana (Collins, 2010) encompassed breathing control, or pranayama, the management of seated posture, or asana, and the withdrawal of the senses, or pratyahara (Frawley, 2004). One recent review in the journal "Alternative Medicine" concluded that on all health outcomes except the enhancement of physical fitness, such practices were at least as effective as exercise (Ross and Thomas, 2010).

Sushruta suggested that Vayu, Lord of the winds, was disturbed by prolonged hard work, carrying heavy loads and by violent movements; the kapha humor, or phlegm (formed from water and earth) was increased by a sedentary lifestyle. Nevertheless, Sushruta recommended exercising in winter and spring at a half of maximal capacity (to the point when sweating began), and he suggested (Tipton, 2008):

"diseases fly from a person who is habituated to regular physical activity"

Charaka saw equilibrium of the tissue elements as the basis of health. The goal was to match the three Doshas: Vata (air and ether), Pitta (water and fire) and Kapha. However, he also advocated running, swimming, jumping, tumbling and wrestling against opponents of superior strength.

Chinese Civilizations

Like other ancient civilizations, the movement of the Chinese to large permanent settlements began along the fertile banks of two large river deltas, the Yellow River and to a lesser extent the Yangtse. The earliest era was the Shang dynasty, from the 17th to the 11th centuries, BCE (Chang, 1980)). This was succeeded by the Zhou dynasty, from the 12th to the 5th century BCE, and after a five year period of unification as the Qin state (221-206 BCE), the Han dynasty held sway to 220 CE.

Economy. The farming of small-seeded grains such as millet was established by 7000 BCE, and cliff carvings from at least 5000 BCE illustrate hunting and grazing. Archaeologists have unearthed a smelter and bronze products such as cooking pots and axes dating back to 2000 BCE, as well as jade figurines. During this period, Yu the Great (c. 2200-2100 BCE) began attempts to control flooding and irrigate crops. The Shang rulers had authority to mobilize the population both as conscript labourers and as soldiers. The military were equipped with bronze or leather helmets and a variety of stone and bronze weaponry, including spears, pole-axes, pole-based dagger-axes, and bows, and they were expected to run very long distance in this equipment (Sawyer and Sawyer, 1994).

Iron was introduced during the Zhou dynasty. This has been compared with the European Feudal period, since the ruling class allocated small plots of land to each of their subjects. However, the Chinese ruled from walled semi-independent cities rather than from castles. The

development of reservoirs and irrigation canals progressively increased the yield from the fields. A powerful army backed by chariots fought many wars against the surrounding barbarians. The leading thinkers of this period were Confucius (551-479 BCE) (Clements, 2008) and Laozi (6th century BCE), founder of Taoism (Kirkland, 2004).

During the Han dynasty, society became divided into a complex hierarchy of 20 strata, plus occasional slaves (Ch'u, 1972). Technical innovations included design of the Junk and introduction of the wheelbarrow. New mechanical devices included the waterwheel, a mechanical bellows for smelting, pumps for the irrigation systems, a belt drive for quilting, and a crank-driven winnowing machine (Needham, 1986). Staple crops were rice, millet and beans, supplemented by bamboo shoots, taro and fruits such as chestnuts, pears, plums, peaches, melons, apricots, strawberries, red bayberries, jujube dates and calabash. Varied sources of protein included domesticated animals (chickens, Mandarin ducks, geese, cows, sheep, pigs, camels and dogs), turtles, fish, owl, pheasant, magpie, partridge and sika deer (Wang, 1982). The main responsibility of the women, in addition to child-rearing, was the weaving of silk cloth (Speak, 1999).

Sport and recreation. Early Chinese civilizations engaged in various types of sport and recreation, sometimes as a form of military preparation and sometimes for entertainment. However, Confuscian philosophy generally discouraged competition (Ren, 1993).The process of physical activity was seen as more important than the outcome, and both the winner and the loser of any competition were expected to gain respect from their participation in an event. For example, an archery contest for the elite would be followed by a bout of social drinking and feasting.

Perhaps the oldest Chinese historical book, the Shiji (109-91 BCE), records an interest in physically demanding games such as Cuju (Witzig, 2006) (an early form of football, played with a soft, hair-filled ball, and dating back to the Han dynasty). It was initially enjoyed by the Emperors, and subsequently seen as a means of maintaining the physical preparedness of the military. During the Tang dynasty, the ball became air-filled, and in its Bai Da form it was no longer a competitive sport**.** Polo originated in Persia, but a form of polo known as dakyu became popular among the Chinese elite, particularly during the Tang dynasty. In this era, virtually every emperor prided himself on his polo skills (Sasajima, 1971). Hunting was also popular among all classes, both as a sport and as a means of gathering food.

The popularity of long distance running apparently goes back to the time of the legendary giant Kuafu, who decided that fast footwork would allow him to catch the sun; he drank the Yellow River dry during his attempt, and died shortly thereafter (Yang and An, 2005). Bodyguards were expected to run behind the horse-drawn carriages of the elite, and from the 6th century BCE onwards, soldiers were required to complete without a break a cross-country run of 300 Li (probably a distance of some 150 km) while wearing full body armour and carrying their weapons. Such military ultra-marathons continued through to the Yuan Dynasty (1271-1368 CE), when the winner of a 180 Li race was awarded a silver disc; such events were seen as a way for generals to judge the fitness of their troops. Boys were required to learn archery and charioteering from the age of

15 years, and the military engaged in training exercises in the first month of winter, practicing the skills of archery, swordsmanship, charioteering, wrestling, running, throwing, jumping and tug-of-war (Speak, 1999).

During the Warring States period (770 -221 BC), various extreme strength contests emerged. Qiao guan involved the lifting of massive iron door bars. and by the Tang Dynasty, this skill was a requirement not only for hefty court warriors, but also for aspiring army cadets. In Ju ding, contestants lifted gigantic cooking pots by their ringed handles. One renowned strongman named Wuhuo reputedly hoisted a 500 kilo vessel (Ivanhoe and Bloom, 2009). During the Han Dynasty (206 BC -AD 220), other contests involved lifting deer, heavy stones and wheels, and the uprooting of trees.

Wrestling, boxing, rowing, kicking shuttlecock, and kite flying were other male sporting activities during this era. In the earliest form of wrestling (jiaodi), athletes wore ox horns and imitated wild oxen as they fought with each other (Chinese Kuoshu Institute, 2003). Women appear to have engaged in dancing, swimming, fishing and boating (Speak 1999). Dragon dances and Dragon-boat contests marked annual festivals honoring the ancestors; these events were sometimes associated with Dang qiuqian (swinging contests).

Spectator activities for the elite included displays of dance, acrobatics and chariot racing. Imitations of animals became incorporated into some forms of dancing. The chariot races were often associated with gambling, as were as cock- and cricket-fights. The Chinese nobility also enjoyed various sedentary pursuits, including games of cards, chess, and board games. “Grass-fighting” was a female pursuit that involved picking grass, naming it and writing a verse couplet that included this name.

Health. Han-era physicians believed that the human body was subject to the same forces of Yin and Yang that governed the greater universe. Illness was viewed as a sign that qi or "vital energy" channels leading to a body organ had been disrupted. Thus, physicians prescribed medicine to counteract the perceived imbalance. Since the wood phase was believed to promote the fire phase, medicaments associated with the wood phase were administered to heal an organ associated with the fire phase. Zhang Zhongjing (c. 150–c. 219 CE) ordered diets rich in certain foods to curb specific illnesses. The Shan Hai Jing therapies included moxibustion (the burning of mugweed on the skin), acupuncture, and calisthenics.

The idea of balancing the Yin and the Yang is deeply imbedded in Chinese concepts of health (Speak, 1999), as I noted in a Chinese post-doctoral fellow who worked in our Faculty during the 1980s. Acupuncture was conceived primarily as a means of opening up blocked pathways, thus allowing a rebalancing of the Yin and the Yang, and breathing exercises were also thought to facilitate this process.

“To pant, to puff, to sip, to spit out the old breath and draw in the new, practising bear hangings and bird stretchings, ... is typical of those who practice Dao Yin” (Ren, 1993)

Muscular development was not encouraged by either Taoism or Confuscianism (Speak, 1999). Nevertheless, Confucius recognized that physical inactivity was associated with

certain organ malfunctions and internal stoppages. Cong Fu gymnastics was thus developed, as early as 2500 BCE. Pere Amiot described monks undergoing stretching movements, During the Chou and Chin dynasties, the emphasis was on the Dao (breathing exercises, stretching and massage.) induction and immobility, During the Han dynasty, the physician Hua'to became an enthusiastic proponent of systematic exercise as a means of health promotion, although not to the point of severe exertion; he recommended "frolics" that mimicked the actions of wild life, strengthened the legs, enhanced health and prevented aging. Typical Cong Fu programmes combined various stances and movements, with specific foot positions and imitations of animal fighting. Exercise was seen as contributing to longevity through the achievement of mental and physical harmony. Gentle activity was needed for this purpose, as vigorous movement would disrupt the desired harmony of breathing, movement and mood.

Conclusions

In many parts of the world, large and fertile alluvial flood plains facilitated the shift from a hunter-gatherer society to pastoral life. With agricultural surpluses made possible by the development of irrigation, quite large settlements became established. This in turn fostered the emergence of class structures, often with an elite ruling class, government officials, soldiers to protect and augment new-found wealth, common labourers and slaves from subjugated territories.

Available evidence points to differing health and fitness needs between these several classes of society, although there is little information on the status of women. Occasionally (as in Egypt) the ruler was expected to demonstrate physical prowess, and hunting and other sports were often pursued by the elite for pleasure rather than an enhancement of personal fitness. The development of spectator sports, feasting and sedentary games brought obesity to many of the elite, and archaeological evidence suggests a substantial prevalence of atherosclerosis and other diseases associated with over-eating and a sedentary lifestyle.

The soldiers typically had to wear heavy armour and carry their weapons; we may thus presume that a combination of military duties and sports participation maintained their level of fitness. Occupational physical activity was heavy for most labourers and slaves, and a lack of fitness again seems unlikely in this segment of the population. However, we see the gradual emergence of passive transportation, and in the latter phases of the Han dynasty in China and the era of Ptolemy IV in Egypt, an increasing use of water power seems an early harbinger of the industrial age.

In most of these early civilizations, illness was associated with some offence against the gods and/or an imbalance among four or five poorly understood "body humours." Physicians progressively from the ranks of priesthood, and although their therapeutic repertoire included the administration of herbs and certain forms of surgery, a heavy reliance on magical incantations continued. Only a few lone voices advocated exercise for its health benefits. Amongst this small group, the Indian physician Sushruta stands out for his recommendation of regular physical activity in the aerobic training zone.

Author's Qualifications

The author's qualifications are: Roy J. Shephard M.D., Ph.D., LL.D., D.P.E., F.A.C.S.M.

References

Adams, F. 1844. *The seven books of Paulus Aegineta: translated from the Greek: with a commentary embracing a complete view of the knowledge possessed by the Greeks, Romans, and Arabians on all subjects connected with medicine and surgery.* London, UK: Sydenham Society.

Allam, A., Thompson, R. C., Wann, S., Miyamato, M. I. and Thomas, G. S. 2009. Computed tomographic assessment of atherosclerosis in ancient Egyptian mummies. *J.A.M.A.* **302**: 2091-2094.

Armstrong, K. 2001. *Buddha*. New York, NY: Penguin Books.

Avalos, H. 1995. *Illness and Health Care in the Ancient Near East: the Role of the Temple in Greece, Mesopotamia, and Israel*. Atlanta, GA: Scholars Press.

Bettman, O. L. 1956. *A pictorial history of medicine*. Springfield, IL: C.C. Thomas.

Booth, C. 2005. *The Hyskos period in Egypt*. Princes Risborough, UK: Shire Publications.

Breasted, J. H. 1906. *Ancient records of Egypt; Historical documents from the earliest times to the Persian Conquest*. Chicago, IL: University of Chicago Press.

Breasted, J. H. 1909. *History of Egypt from the earliest time to the Persian conquest.* New York, NY: C. Scribner's Sons.

Brunner, C. J. 1978. The Middle Persian Explanation of Chess and Invention of Backgammon. *J. Ancient Near East. Soc. Columbia Univ*. **10**: 43-51.

Ch'u, T.-t. 1972. *Han Dynasty China: Volume 1: Han Social Structure*. Seattle, WA: University of Washington Press.

Chadwick, R. 1992. Calendars, Ziggurats, and the Stars. *Can. Soc. Mesopot. Stud. Bull*. **24**: 7-24.

Chang, K.-C. 1980. *Shang Civilization*. New Haven, CONN: Yale University Press.

Chinese Kuoshu Institute. (2003). Virtue, humility and wisdom through Chinese martial arts. *http://www.kuoshu.co.uk/History - SJ.htm* Accessed November 23rd, 2011.

Clements, J. 2008. *Confucius: A Biography*. Stroud, UK: Sutton Publishing.

Collins, S. 2010. *Nirvana: Concept, Imagery, Narrative*. Cambridge, UK: Cambridge University Press.

Darby, W. J., Ghallounghul, P. and Grivatti, L. 1977. *Food: The gift of Osiris.* London, UK: Academic Press.

David, A. R., Kershaw, A. and Heagerty, A. 2010. Atherosclerosis and diet in ancient Egypt. *Lancet* **375**: 718-719.

Dawson, W. R. 1928. The pig in ancient Egypt: A commentary on two passages of Herodotus. *J. Roy Asiatic Soc, G.B. North. Ire.* **3**: 597-608.

Dryden, J. 1864. *Plutarch, Lives*. New York, NY: The Modern Library.

Erman, A. 1894. *Life in ancient Egypt*. London, UK: Macmillan and Co.

Filer, J. 1996. *Disease*. Austin, TX: University of Texas Press.

Frawley, D. 2004. *Yoga and Ayurveda*. Delhi, India: Motilal Banarsidass Publishers.

Gabriel, R. A. 2006. *The ancient world, Soldiers' lives through history*. Westport, CONN: Greenwood Press.

Garnsey, P. 1999. *Food and Society in Classical Antiquity*. New York, NY: Cambridge University Press.

Gibson, M. (1990). *Nippur, 1990: Gula, Goddess of healing, and an Akkadian tomb*. News and Notes #125. Chicago, IL, Oriental Institute, University of Chicago.

Green, P. 1989. *Classical bearings: Interpreting ancient history and culture*. London, UK: Thames & Hudson.

Hackett, J. A. 1998. There was no king in Israel: The era of the judges. In: *The Oxford History of the Biblical World*. Coogan, M.W., ed. Oxford, UK: Oxford University Press**,** pp. 132-164.

Harris, J. E. and Wente, F. 1980. *An x-ray atlas of the royal mummies*. Chicago, IL: University of Chicago Press.

Haudricourt, A. G. and Delmarre, M. J. 1956. *L'homme et le charrue à travers le monde (Humans and the plough around the world).* Paris, France: Gallimard.

Healy, M. 1993. *Quadesh, 1300 BC: Clash of the warrior kings*. Botley, Oxford, UK: Osprey Publishing,

Heynick, F. 2002. *Jews and medicine: An epic saga*. Hoboken, NJ: KTAV Publishing House.

Hill, D. 1984. *A history of engineering*. London, UK: Croom Helm.

Horstmanshoff, H. F. J., Stol, M. and Tilburg, C. 2004. *Magic and rationality in ancient*

near-eastern and Graeco-Roman medicine. Leiden, Netherlands: Brill Publishers.

Howell, M. L. (1971). Archaeological evidence of sports and games in ancient civilizations: interpretive comments. *Proceedings of the 2nd World Symposium on the history of sport and physical education, Banff, A*L.

Ivanhoe, P. J. and Bloom, I. 2009. *Mencius*. New York, NY: Columbia University Press.

James, T. G. H. 2005. *The British Museum concise introduction to ancient Egypt*. Ann Arbor, MI: University of Michigan Press.

Kenoyer, J. M. 1997. Trade and Technology of the Indus Valley: New Insights from Harappa, Pakistan. *World Archaeol*. **29**: 262-280.

Kirkland, R. 2004. *Taoism: The enduring tradition*. Abingdon, UK: Routledge.

Kranzberg, M. and Gies, J. 1975. *By the sweat of thy brow: work in the western world*. New York, NY: Putnam.

Köcher, F. 1980. *Die babylonische-assyrische Medizin in Texten und Undersuchungen (Babylonian-Assyrian medicine in text and research).* Berlin, Germany: Walter de Gruyter.

Labat, R. 1951. *Traité Akkadien de diagnostics et pronostics médicaux. 1. Transcription et traduction (Treatise on medical diagnosis and prognosis: transcript and translation*. Leiden, Netherlands: E.J. Brill.

Lichtheim, M. 2006. *Ancient Egyptian Literature. Vol. III: The Late Period*. Berkeley, CA: University of California Press.

Luijendijk, D. H. 2005. *Kalarippayat: India's Ancient Martial Art*. Boulder, CO: Paladin Press.

Maher, M. (2010). The ancient Egyptian Olympic movement towards peace. *http://www.allacademic.com/meta/p415451_index.html*. Accessed November 16th, 2011.

Manuelian, P. D. 1998. *Egypt: The World of the Pharaohs*. Cologne, Germany: Könemann Verlagsgesellschaft mbH.

McNutt, P. 1999. *Reconstructing the society of ancient Israel*. Louisville, KY: Westminster John Knox Press.

Murnane, W. J. 1981. The Sed festival: a problem in historical method. Mitteilungen des Deutschen Archaölogischen Instituts **37**: 369-376.

Murphy, N. J., Bulkow, N. R., Schraer, C. D. and Lanier, A. P. 1992. Diabetes mellitus in Alaskan Yu'pik Eskimos and Athabascan Indians after 25 years. *Diabetes Care* **15**: 1390-1392.

Murray, M. A. 2000. Cereal production and processing; fruits, vegetables, pulses and condiments. In: *Ancient Egyptian materials and technology*. P. T. Nicholson and I. Shaw, editors. Cambridge, UK: Cambridge University Press.**:** pp. 505-536 and 609-655.

Murry, H. J. 1913. *A history of chess*. Oxford, UK: Oxford University Press.

Mutimer, B. T. P. (1970). Play forms of the ancient Egyptians. *Proceedings of the 1st Canadian Symposium on the history of sport and physical education, Edmonton, AL*., Ottawa, ON: Fitness & Health Canada.

Needham, J. 1986. *Science and Civilization in China*. Taipei, Taiwan: Caves Books Ltd.

Nemet-Nejat, K. R. 1998. *Daily life in ancient Mesopotamia. Chapter 8: Recreation*. Westport, Conn: Greenwood Press.

Oleson, J. P. 2000. Water-lifting. Handbook of Ancient Water Technology, In: *Technology and Change in History*. O. Wikander (ed.). Leiden, Netherlands: Brill Publishing, pp. 217-302.

Olmstead, A. T. E. 1923. *History of Assyria*. New York, NY: C. Scribner's Sons.

Osler, W. 1921. *The evolution of modern medicine; a series of lectures delivered at Yale University on the Silliman foundation, in April, 1913*. New Haven, Conn: Yale University Press.

Parkinson, R., B. 1999. *The tale of Sinuhe and other Egyptian poems, 1940 - 1640 BC*. Oxford, UK: Oxford University Press.

Piccione, A. 1980. In search of the meaning of Senet. *Archaeol*. **33**: 55-58.

Possehl, G. L. 1982. *Harrapan civilization: A recent perspective*. Oxford, UK: Oxford University Press.

Possehl, G. L. 2002. *The Indus Civilization: A Contemporary Perspective*. Walnut Creek, CA, AltaMira Press.

Prioreschi, P. 1998. *A history of medicine: Greek medicine*. Omaha, NB: Horatius Press.

Radha, S. S. 2006. *Hatha Yoga: The Hidden Language, Secrets and Metaphors*. Kootenay, BC: Timeless Books.

Rawlinson, G. 1942. *The History of Herodotus. A new English version with notes. Book 2:47 Euterpe*. New York, NY: Random House.

Ren, H. 1993. *History of Sports in China*. Beijing, China, People's Sports Press.

Ross, A. and Thomas, S. 2010. The Health Benefits of Yoga and Exercise: A Review of Comparison Studies. *J. Alt. Compl. Med*. **16**: 3-12.

Ruffer, M. A. 1910-1911. On arterial lesions found in Egyptian mummies. *J. Path. Bacteriol*. **15**: 453-462.

Ruffer, M. A. 1910a. Studies in the palaeopathology of Egypt. Chicago, IL: University of Chicago Press.

Ryan, A. J. 1974. The history of sports medicine. In: *Sports Medicine*. A. J. Ryan and F.L. Allman, eds. New York, NY: Academic Press.

Salter, M. A. 1971. Mortuary games of the Eastern culture area. *Can. J. Hist. Sport* **2**: 160-197.

Samuel, D. 2000. Brewing and baking. In: *Ancient Egyptian materials and technology*. P. T. Nicholson and I. Shaw, I. (eds.). Cambridge, UK: Cambridge University Press**:** 537-576pp.

Saraf, S. and Parihar, R. S. 2007. Sushruta: The first Plastic Surgeon in 600 B.C. *Internet J. Plast. Surg*. **4 (2)**.

Sasajima, K. (1971). Ancient Chinese sports and games brought into Japan in ancient times and their Japanization. *Proceedings of 2nd World Symposium on the history of sport and physical education, Banff, AL*.

Sawyer, R. D. and Sawyer, M.-C. L. 1994. *Sun Tzu's The Art of War*. New York, NY: Barnes & Noble.

Sayce, A. H. 1908. *The archaeology of the cuneiform inscriptions*. London, UK: Society for the Promotion of Christian Knowledge.

Schäfer, P. 2003. *The History of the Jews in the Greco-Roman World*. London, UK: Routledge/Psychology Press.

Scurlock, J. A. and Andersen, B. R. 2005. *Diagnoses in Assyrian and Babylonian medicine: ancient sources, translations and modern medical analyses*. Champaign, IL: University of Illinois Press.

Shattock, S. G. 1908-1909. A report on the pathological condition of the aorta of king Menephtah, traditionally regarded as the pharaoh of the exodus. *Proc. Roy. Soc. Med*. **2** (Path. Sect.): 122-127.

Shehata, M. 2004. The father of medicine: A historical reconsideration. *J. Med, Ethics* **12**: 171-176.

Shephard, R. J. 2011. The developing understanding of human health and fitness. 1. Prehistory. *Health & Fitness Journal of Canada* **4 (4):** 3-19.

Sherman, D. M. 2002. *Tending Animals in the Global Village*. Oxford, UK: Blackwell Publishing.

Silva, J. M. E. 2010. A medicina na Mesopotâmia antiga (Medicine in ancient Mesopotamia). *Acta Med. Portuguesa* **23**: 125-140.

Simri, U. 1966. *The religious and magical functions of ball games in various cultures*. Morgantown, W VA: West Virginia University.

Smith, S. 1975. *Babylonian historical texts relating to the capture and downfall of Babylon.* Hildesheim, Germany, Georg Olms.

Smith, W. H. 1982. Erasistratus's dietetic medicine. *Bull. Hist. Med*. **56**: 398-409.

Speak, M. 1999. Sport and recreation in ancient China. In: *Sport and Physical Education in China*. J. Riordan and R.E.Jones, (eds.). London, UK: E & F. Spon**:** 20-45pp.

Spier, D. L. (1970). The influence of warfare on recreational activities of the ancient Assyrians. *Proceedings, Ist Canadian International Symposium on the History of Sport and Physical Education*, Ottawa, ON: Fitness & Health Canada.

Stager, L. E. 1998. Forging an Identity: The Emergence of Ancient Israel. In: *The Oxford History of the Biblical World*. M. D. Coogan (ed.). Oxford, UK: Oxford University Press**:** 90-131pp.

Stol, M. 1993. *Epilepsy in Babylonia*. Leiden, Netherlands, Brill Publishers.

Tannahill, R. 1968. *The fine art of food*. London, UK: Folio Society.

Thapar, R. 2004. *Early India: From the origins to AD 1300*. Berkeley, CA: University of California Press.

Thompson, R. C. 1923. *Assyrian medical texts from the originals in the British Museum*. Oxford, UK: Oxford University Press.

Thompson, T. L. 1992. *Early history of the Israelite people*. Leiden, NetherlandsL Brill Publishing.

Thompson, W. R. and Hay, I. D. 2004. Complexity. Diminishing marginal returns and Mesopomatanian fragmentation. *J. World Systems Res*. **28**: 1187-1198.

Tipton, C. M. 2008. Historical perspective: The antiquity of exercise, exercise physiology and the exercise prescription for health. In: *Nutrition and fitness: cultural, genetic and metabolic aspects*. A. Simopolous (ed.). Basel, Switzerland: Karger**:** pp. 198-245.

Touny, A. D. and Wenig, S. 1969. *History of Sports in ancient Egypt (trans. J. Becker)*. Leipzig, Germany: Edition Leipzig.
van de Mieroop, M. 2005. *King Hammurabi of Babylon*. Oxford, UK: Blackwell.
Vilnay, Z. (1969). Sport in ancient Israel. *Proceedings 1st International seminar on the history of physical education and sport, Netanya, Israel*: Wingate Institute, Wingate Institute.
von Klein, C. H. 1905. *Medical features of the Papyrus Ebers*. Chicago, IL: American Medical Association.
von Staden, H. 1998. *Herophilus: The art of medicine in early Alexandria*. Cambridge, UK: Cambridge University Press.
Wang, Z. 1982. *Han Civilization. Translated by K.C. Chang and Collaborators*. New Haven, CONN: Yale University Press.
Witzig, R. 2006. *The global art of soccer*. New Orleans, LA: Cusiboy Publishing.
Wood, J. A. 1998. *Perspectives on war in the Bible*. Macon, GA: Mercer University Press.
Woodward, R. D. 2008. *The ancient languages of Mesopotamia, Egypt and Aksum.* Cambridge, UK: Cambridge University Press.
Wuest, D. A. and Bucher, C. A. 1995. *Foundations of Physical Education and Sport.* St. Louis, MO: Mosby.
Yamada, S. 2000. *The construction of the Assyrian empire: a historical study of the inscriptions of Shalmanes III relating to his campaigns in the west*. Leiden, Netherlands: Brill.
Yang, L. and An, D. 2005. *Handbook of Chinese mythology*. Santa Barbara, CA: ABC-Clio.
Ziegler, E. (1972). A brief chronicle of sport and physical activity for women. *Proceedings of the 2nd Canadian Symposium on the history of sport and physical education, Windsor, ON*., Ottawa, ON: Sport Canada.
Zysk, K. G. 1998. *Medicine in the Veda: religious healing in the Veda; with translations and annotations of medical hymns from the R□gveda and the Atharvaveda and renderings from the corresponding ritual texts*. Delhi, India: Motilal Banarsidass Publications.