

ṬABAQĀT AL-UMAM OF QĀDĪ ŠĀ'ID AL-ANDALUSĪ (1029-1070 A.D.)

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ABSTRACT

The paper gives a brief outline of the life and times of Qādi Sāid and contains a critical study of his *Ṭabaqāt al-Umam*. The work was written at Toledo in 1068 A.D. Different editions of the work are available but most of them are incomplete. However a summary of its contents is given with special reference to the chapter on Sciences in India. This book demonstrates the objectivity, impartiality and critical approach of the author. According to him there were only eight nations i.e. the Indians, the Persians, the Chaldeans, the Greeks, the Byzantines, the Egyptians, the Israelites, the Arabs and the Andalusians who had contributed to the development of sciences during his time and the author laid emphasis on mathematics, astronomy, medicine, human geography and other subjects. The *Ṭabaqāt* has been translated into French, Persian, Urdu and English. The value, importance, merits and demerits of the book are brought out showing that it has been used as a source book by several medieval and modern historians of science.

Key words : *Ṭabaqāt al-Umam*, Qādi Sāid al-Andalusī, *Toledan tables*, *Canons*, *al-Fihrist*, *Rasāla* of al-Fārābi, Brahmagupta, Ibn al-Haytham, Burning mirror.

The *Ṭabaqāt al-Umam* (Categories of Nations) by Qādi Šā'id al-Andalusī, is a work of importance, being the first world history of science.¹ The author has not received due attention he deserves either from the muslim biographers or from modern historians of science. The two well-known Arab authorities, al-Qifṭī (d. 1248 A.D.) and Ibn Abi Uṣaybi'ā (d. 1270 A.D.), who have drawn extensively from the *Ṭabaqāt*, have also failed to notice him.² Abūl-Qāsim Šā'id ibn Aḥmed ibn 'Abd'ur-Raḥmān ibn Muḥammad ibn Šā'id al-Andalusī belonged to an Arab tribe called Banū Taghlīb or Banū Tha'laba³. The family settled in Cordoba. His grand-father Abu'l Muṭarrif 'Abd'ur-Raḥmān ibn Muḥammad ibn Šā'id ibn Wāthiq was the Qādī (Judge) of Sidonia and his father Aḥmad ibn 'Abd'ur-Raḥmān ibn Muḥammad ibn Šā'id held a post at Cordoba (Qurṭuba)⁴. He was born at al-Mrīya (Almeria) in 420/1029. Possibly he started his education in Cordoba and completed it in Toledo, capital of the Dhun-Nūn dynasty at that time. The names of his five teachers can be known from stray references found in the *Ṭabaqāt*⁵ and other sources. They were Ibn Ḥazm⁶ (d. 456/1064), Abu'l-Walīd Hishām ibn Aḥmad ibn Hishām ibn Khālīd al-Kin'ānī known as Ibn al-Waqqāshī⁷ (d.

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489/1085); Abū Muḥammad al-Qāsim ibn al-Faṭḥ (d. 451/1059), Abū Ja'far Aḥmad ibn Khamīs of Toledo (d. 454/1062), and Abū Ishāq Ibrāhīm ibn Idrīs at-Tujībī (d. 454/1062).

Ṣā'id stated that he met Ibn al-Waqqāshī in 433/1046 at Toledo.⁸ Probably the same year, Ṣā'id travelled to Toledo. He was then about eighteen years old and he seems to have completed his higher education in Toledo under distinguished teachers such as Ibn Khamīs, Ibn al-Waqqāshī, al-Tujībī and others. He studied *ḥadīth*, logic, literature, philosophy, medicine, mathematics and astronomy. In particular, he specialized in Muslim jurisprudence, history, and astronomy, in all of which he soon achieved distinction and fame. It can safely be stated that after 438/1046, Ṣā'id lived mainly at Toledo.

In 399/1009, the usurping 'Āmirid 'Abdu'r-Raḥmān Sanchol died and the dismemberment of the Umayyad state of Andalusia began. After the fall of Cordoba in 423/1031, Arab Spain was divided into a number of petty states,⁹ established by Arab and Berber chiefs. Mention may be made of the states of Ishbīliya (Seville), Gharnāṭa (Granada), Mursīya (Murcia), and Balansiya (Valencia). Of these the Abbaidids of Seville and Banū Dhun-Nun of Toledo were the most important. The latter was founded by an old Berber family in 423/1032. It fell permanently to the Christians in the year 478/1085.

With the fall of the Umayyads of Andalusia, the process of cultural decentralisation started, and the capitals of the petty states became centres of intellectual and artistic activity. Toledo,¹⁰ as the capital of the Dhun-Nūn dynasty, soon became the centre of scientific and literary culture. Its rulers patronized not only poets and literary men but also astronomers, astrologers, physicians and philosophers. This Court created a stimulating environment at that time for literary men like Ṣā'id. His vast learning must have attracted the attention of Amīr Abu'l-Ḥusain Yaḥyā ibn Isrā'īl ibn Amīr ibn Muṭarrif ibn Mūsā of the Dhun-Nūn dynasty¹¹ who appointed him a Mālikī Judge of Toledo.

It is evident that over and above his official duties he continued his study of astronomy and devoted his time to astronomical observations in collaboration with Jewish astronomers and also with the well-known Ibn az-Zarqalluh. Further details of his life are not known, but it is recorded that he died on the 4th Shawwal, 462/6th July, 1070 at the age of only forty-two,¹² while still a judge in Toledo. His funeral prayer was led by Yaḥya ibn Sā'id al-Ḥadīdī, a learned man of Toledo and the most illustrious dignitary of the court.¹³

A Jewish source, *Jasod olam*¹⁴ speaks highly of Ṣā'id's love of science, his patronage of scientists, his generosity and his keen interest in astronomy (Book IV,

Chap. 7) Abraham ben Seamu'el ha-Levi ben Hasdai (1st half of the 13th century) leaves a short account of Ibn Sa'id's *History of Scholars*¹⁵ in the introduction to his translation of *Kitāle al-Ustuqussāt* by Isac bin Salomo Israeli. (the Elder)

Ṣā'id made a number of astronomical observations at Cordoba and Toledo in collaboration with Muslim and Jewish astronomers. These observations and their ancillary studies were made by Ṣā'id in association with his younger contemporary Ibn az-Zarqalluh but Ṣā'id did not make any statement about it in this book. *Their results* later laid the foundation of the well-known *Toledan Tables* and *Canons*. In a study published recently, two new literary evidences, the "Paris Scribe" and Robert of Ketton – have been put forward attesting to Ṣā'id's contributions to the construction of the *Toledan Table* and *canons* and it is added that "We cannot avoid drawing the conclusion that work on a comprehensive *zī* had not yet began when Ṣā'id completed his *Ṭabaqāt*"¹⁶. Ṣā'id and Ibn az-Zarqalluh were the two leading astronomers of Toledo during the mid-eleventh century. But he did not specialize only in astronomy. Like al-Mas'ūdī the humanist, his knowledge was of encyclopedic character.

A notable trait of his character was his broad outlook as has been attested by the Jewish sources mentioned above. He has devoted one full chapter on "Sciences Among Istaelites". Another proof of his catholicity of mind is that he has written a long and substantial chapter on the "Sciences in India" although he knew that the Indians were non-Muslims.

QĀḌĪ SĀĪD'S OTHER WORKS

Three titles among his works are mentioned in the *Ṭabaqāt*. The first is the *Iṣlāh Harakāt an-Nujūn* Corrections of kie Movement of Stars, presumably an assessment of the work of the former astronomers. The second book was the *Maqālāt ahl al-milal wan-Niḥal*¹⁷ (*the Discourses on People of Religions and Sects*) which perhaps was influenced by the well-known work of Ibn Ḥazm on the same subject. The third is the *Jawāmi 'Akhbār al-Uman min al-'Arab wa'l-'Ajame* Collection of Reports about Arab and non-Arab Peoples, which seems to have been a universal history. Casiri and al-Zir'ekli suggest that he was also the author of a *Tarīkh al-Andalus (History of Audalusia)* in an abridged form. Except the *Ṭabaqāt*, which was written in 460/1068 no other work of Ṣā'id seems to be extant.¹⁸ It is evident from his lost works that he specialised in history and astronomy.

THE EDITIONS & TRANSLATION OF ṬABAQĀT AND ITS POPULARITY

The *Ṭabaqāt al-Umam* is available in several editions. An incomplete edition was published by Louis Cheikhō in *Mashriq* (Beirut) in 1911. He later published the complete text with French and Arabic introduction, notes, variants, and indexes in

1912. Both were based on an 18th century Ms. which Cheikho had acquired at Demascus. There are also two cheap Egyptian reprints,¹⁹ neither of which bears the date of publication. They are, in fact, copies of Cheikho's edition with minor additions, alterations, corrections but there are some additional errors as well. In 1387/1967 the Haidariyah press of Najaf, Iraq, published an inexpensive reprint.²⁰ An unsatisfactory edition has been published recently at Beirut²¹. There are good reasons to believe that the complete text of the book is not available in these editions. The present writer is at present engaged in preparing a complete and critical edition based on Cairo, Istanbul and Dublin Manuscripts.²²

As a recognition of its importance, the *Ṭabaqāt* has been translated into several languages. Qādī Aḥmed Miyān Akhtar²³ translated it into Urdu which was published in 1928. Its French translation by Régis Blachere as *Livre des Catégories des Nations* was published in 1935.²⁴ Its Persian²⁵ translation by Jalāluddīn Tehrānī was published in *Gāhnāma*. Joshua Finkel studied the chapter on science among the Israelites, "An Eleventh Century Source for the History of Jewish Scientists in Mohammedan Land²⁶ (Ibn Ṣā'id)" in which an English translation of the chapter on the sciences in Israel has been published. The present writer has published four papers dealing with four chapters of this book on along with in Indian, Chaldean, Persian and Byzantine sciences, English translation²⁷.

The *Ṭabaqāt* was quite popular in Andalusia and its scholars were proud of it. They were in the habit of reading out this book to the scholars of the east (Maṣḥriq). It is recorded that a learned man of Andalusia Abū Md. 'Abdullāh ibn Md. Marzūq al-Yahsūbī had stopped at Alexandria while on his way to Mecca for pilgrimage and he read out the *Ṭabaqāt* to the traditionist, Abū Ṭahir as-Silafī, the Egyptian²⁸ (d. 576/1188). Al-Yahsūbī had read it with Ibn Barrāl who was a student of Ṣā'id himself. In Andalusia a student of Ibn Barral and his students copied information from the *Ṭabaqāt*.²⁹

ṢĀ'ID'S SOURCES

Ṣā'id's sources are both verbal and written. The chapter on sciences in Andalusia contains much valuable information derived from verbal sources such as friends, students and acquaintances whose names he has recorded. Like other Arab writers and authors, Ṣā'id seldom gives information about his written sources. But he has mentioned *Kitāb al-Ikḥlāl* and *Kitāb Jaḥīrat al-'Arab* by al-Hamdānī (d. 334/945), *Kitāb al-Ma'ārīf* by Ibn Qutaybah ad-Dīnawārī (d. 276/889); *Kitāb al-Ulūf*; *Kitāb al-Mudhākārāt* by Abū Ma'aṣhar al-Balkhī (d. 272/886); *Ta'rīkh ar-Rasul wa'l-Mulūk* by aṭ-Ṭabarī (d.310/923); *Ṣilah at-T'arīkh aṭ-Ṭabarī* by Farghānī (d. 362/973); *Naẓm al-'Iqd* or *Zij al-Kabīr* by Ibn al-Ādamī (Completed by his pupil al-Madā'inī in (338/949), the *Kitāb al-Anwā' of Abū Ḥanūfa ad-Dīnawārī* (d. 282/895); Arabic translation of the *Almagest* of Ptolemy (Batlamīyus d.c.a. 170 A.D.) *Akhbār Miṣṭ* by al-Waṣīfī (not yet identified).

Although he has not acknowledged but there is no doubt that he has used the *Ṭabaqāt al-Aṭibbā' wa'l-Ḥukamā'* (*Classes of Physicians and Philosophers*) by Abū Dā'ūd Sulaymān al-Andalusī known as Ibn Juljul (d. after 384/994).

The two most important books which Ṣā'id acknowledges to have used are the *Kitāb at-Tanbīh wa'l-Ishrāf* of al-Mas'ūdī (d. 345/956) and the *Kitāb al-Fihrist* of Ibn an-Nadīm (d. 380/990). He has mentioned Abu'l ibn al-Ḥusayn al-Mas'ūdī only twice in the whole book in the chapter on sciences among the Greeks without recording the title of his book.

Ṣā'id mentions the *al-Fihrist* of Ibn an-Nadīm as one of his sources twice in the Chapter dealing with the science among Byzantines (people of Rūm). In this case also Ṣā'id has drawn substantial information from the *Fihrist* much more than what he has actually acknowledged. A large part of both the *Fihrist* and the *Ṭabaqāt* are biographical in character, and generally speaking both deal with the cultural history of the ancient and contemporary nations.

In the chapter on Indian sciences he mentions two source books only: a work by an Arab astronomer i.e. the *Kitāb al-Ulūf* of Abū Ma'shar al-Balkhī and a book containing the astronomical tables (*Zīj*) entitled *Naẓm al-'Iqd* compiled by Ibn al-Ādamī. Most probably an Arabic translation of the *Brāhmasphuṭasiddhānta* of Brahamagupta (*Sindhind*) was available to him but he had no knowledge of the Arabic translation of the *Khaṇḍakhādya* by the same author.³¹

Ṣā'id has used the *Risala*³² of al-Fārābī (d. 850 A.D.) in connection with the classification of works of Aristotle but with several modifications. He had also used the *Nawādir al-Falāsifah* of Ḥunayn ibn Ishāq (809-873 A.D.) for giving an account of seven schools of Greek philosophy. Ṣā'id refers to a *Risāla* of the Arab philosopher al-Kindī (d. ca. 866 A.D.) without mentioning its title. It is actually the *Risāla fi Aghrāḍ Kitāb Uqūdaṣ* (*Treatise on the Aims and Objects of the Book of Euclid*).³³

The *Ṭabaqāt al-Aṭibbā' wa'l-Ḥukamā'* (*Classes of Physicians and Philosophers*) by Ibn Juljul, a compatriot of Ṣā'id, was written in 377/987³⁴. Ṣā'id has mentioned him as a physician of Andalusia but has not acknowledged his book as his source. Without doubt, he has used it for writing the chapter on Science in Andalusia.

Certainly, all the relevant books written in the lands of the Eastern Caliphate (*Mashriq*) upto 4th/10th century were not available to him. One of the centres through which the books filtered to Andalusia was certainly Egypt. For example, the *Zīj al-Ḥakīmī* of Ibn Yūnus and Ibn al-Haytham's work on Burning Mirrors, did reach Andalusia quite early because, Egypt occupied the middle position in the route from Andalusia to Mecca and Medina, which were frequently visited by pilgrims and scholars.

It cannot be stated that Ṣā'id had read or used all the 165 books of the authors whose titles he has recorded. Even about the books which he claims to have used, it cannot be stated for certain that he had actually read them in original. It is probable that he could only read their extracts quoted in other books and he did not actually have direct access to them.

The *Tabaqāt* has an important introduction together with chapters on India Persia Greece the Arabs of the East on Andulasia, and on Chaldea, Bryzantine and Egypts. In introduction Ṣā'id stated that humanity was originally composed of seven primitive mations which were divided into many nations covering the whole of the world. They were different from each other by character, physique and language. He further divides them into two categories. Those that have specially occupied themselves with the cultivation of sciences and made contributions to them so that they could be counted as cultured and those that have not done so. He considered the first group to have received the special favours and blessings of God. In this category he mentions the following eight ancient and medieval nations who had participated in the study and development of sciences : the Indians, the Persians, the Chaldeans, the Greeks, the people of Rūm (Byzantines), the Egyptians, the Arabs including those of Andulusia (Spain) and the Israelites.³⁶ In the second group are included the Slavs, the Turks, the Chinese – whose manual skill is described more due to instinct than to intelligence³⁷, the people of Africa excepting the Egyptians. They are not to be counted as cultured as the world could not derive any benefit from them. Ṣā'id takes up each of these eight nations, describes the geographical and physical features of their habitat, discusses the main principles of their religion and characteristics of their language, records their political history briefly, their contributions the the sciences and gives an account of their celebrated scientists and philosophers. The plan is clear and identical in every chapter.

There is an exphasis on the contributions of these nations to philosophy, mathematics, astronomy and medicine. Generally speaking, literary men, poets, jurists and theologians have not been considered. Said was particularly interested in the '*Ulūm al-Awā'il* or '*Ulūm al-Qadīma* or '*Ulūm Ajnabiyah* or '*Ulūm al-Fasaḥiyah* or Philosophical sciences which included philosophy, mathematics, astronomy, astrology, medicine and others.³⁸

The first chapter of this work which deals with Indian sciences covering five closely printed pages of Cheikho's edition (Beirut, 1912; pp. 11-15). Ṣā'id stated that on account of the fact that Indians had made substantial contributions to sciences, they are a nation favoured by God. He added that in antiquity the Indian king was known as the king of wisdom, science and philosophy. India's contributions to mathematical sciences specially astronomy are discussed in some detail. About the usefulness of *Hsāb al-Ghubār* he writes "It is a very compendious and quick system of calculation,

easy to understand, simple to adopt and remarkable in its composition, bearing testimony to the sharp intelligence, creative power and remarkable faculty of invention of the indians". Their expertise in medical science is also acknowledged and the influence of Indian astronomy on the origin and development of Arab astronomy, before that of the Greek, is recorded. Šā'id regrets that he could not obtain much information about Indian sciences because of the distance between India and Andalusia. This chapter records information about an Indian book on music, the Arabic translation of the *Pancatantra* entitled *Kalilah wa Dimnā* and the importance of chess or *Šaṭranj*. The information recorded in the chapter on the sciences and civilization of India are more or less accurate.³⁹

The lack of aptitude for knowledge in the nations of second category and their failure to make positive contributions to the sciences have been attributed partly to geographical and physical causes. However the salient topics will be of interest.

Ancient Sciences

This book also records how the scientific heritage of the ancient nations such as Greek, Indian and Persian passed on to the Arabs. It deals less with the history of science in this medieval world but with its roots in antiquity.⁴⁰

Human Geography

The *Ṭabaqāt* testifies to Šā'id's accurate knowledge of physical and human geography of the then world. He is particular in recording the geographical boundary of the eight nations precisely recording the influence of geographical and physical factors on the physical characteristics, character and language of each nation specially about the influence of the cold and hot zones of the world on their inhabitants which is quite scientific and modern. He states that the Slavs and Bulgars inhabit extreme northern and cold regions of the world while the Negroes, the Nubians and the Zanj are populated near the equator and southern regions which are very hot being situated in the close proximity to the Sun. The cold climate has made the nations white in colour, dull and unintelligent while the nations under the influence of heat are found to be of dark complexion, foolish and illiterate. Even those nations such as the Galicians and Berbers who live close to the temperate zone are cruel and ignorant. These and other nations did not use their mental faculties for the acquisition and development of science and philosophy.⁴¹

Natural History

Atleast in one place in the *Ṭabaqāt* in the chapter on science in Egypt Šā'id has discussed a theory of natural history. He correctly disagrees with the view that all

kinds of strange animals with peculiar constitution had appearance who inhabited the world before the advent of man were destroyed by him. Šā'id states that such statements contradict philosophy and science⁴². The legend constitutes the background of other ancient civilizations of the world also.

Astronomy, Medicine and Mathematics

A perusal of the *Ṭabaqāt* makes it clear that Šā'id was an astronomer and he has displayed expert knowledge of astronomy by recording his critical appreciation of the well-known Muslim and non-Muslim astronomers. Speaking about Maslama al-Majrīī (d. 398/1007) of Cordoba, he writes that he revised the astronomical tables of al-Khwārizmī, converted the Persian dates into Hijrā dates and added some more tables. But he committed the same mistakes like al-Khwārizmī which Šā'id had corrected.⁴³

The astronomer 'Abdullāh bin Aḥmad as-Saraqusī (d. 438/1046) had written a treatise addressed to Abū Muslim ibn Khaldūn of Seville pointing out the defects of the Sindhind's method regarding planetary motions and equations but his arguments were refuted by Šā'id in his lost book on astronomy, ⁴⁴ entitled *Kitāb Iṣlāh Ḥarakāt an-Nujūm* (*Book on the Correction of the Movement of Stars*).

Although Šā'id did not particularly study or practice medicine (*Ṭibb*) yet he gives a critical resume of the contributions of the Andalusians to medicine. He states that he cannot agree with the view of the illustrious physician Ibn Zuhr (d. ca. 470/1078) Moḥammad ibn Marwān of Seville when he forbade baths because if one has a proper bath it is a good physical exercise enumerating its other beneficial effects. ⁴⁵

THE ṬABAQĀT IN LATER WORKS

Said's *Ṭabaqāt* is frequently quoted in the Jewish sources of the medieval and modern times : such as by Issac Ibn Josef Israeli, the younger Abraham ibn Samuel ha Levi ibn Hasdai Yoūsuf ibn al-Wakkār ibn Ishāq ibn Mūsā (ca. 1358 A.D.), S. Fried, M. Steinschneider and other Jewish Arabists.⁴⁶

Among the authors who used the *Ṭabaqāt* as their source are the following: Ibn al-Qiftī (d. 646/1246) in his *Ṭa'riḫ al-Ḥukamā'* and Ibn Abī Uṣaybi'ah ⁴⁷ (d. 668/1270) in his *Uyūn al-Anbā' fi Ṭabaqāt al-Aṭibbā'* have copied several passages from this book. Ibn al-Qiftī has acknowledged his indebtedness to it three times⁴⁸ only but Ibn Abī Uṣaybi'ah does not do so. Abu'l-Faraj ibn al-'Ibrī (Bar Hebraeus d. 1289 A.D.) copies two paragraphs from Šā'id's work in his *Mukhtaṣar ad-Duwal* on sciences among the Arabs⁴⁹. Ibn Khalikān (d. 681/1283) in his *Wāfayāt al-A'yān* refers to this book for his biography of al-Fārābī and Mattā ibn Yūnus. Yaḳūt al-Ḥamawī (d. 626/1228) copies two extracts in his *Irshād as-Arih* ⁵¹ from the *Kitāb* of Qādī Šā'id which

is none other than the *Ṭabaqāt*

The Andalusian polygraph Ibn Ṣā'id⁵² (d. 685/1286) mentions *at-T'arīf bi Akhbār Ḥukamā' al-Uman min al-'Arab wa'l-'Ajam* which is another title of Ṣā'id's *Ṭabaqāt*. When Ibn Ṣā'id updated and supplemented the *Faḍā'il al-Andalus wa' Ajā'ibuhā* of Ibn Ḥazam, he mentioned Abu'l-Qāsim Ṣā'id ibn Aḥmed al-Ṭulaytulī as one of its historians along with Abū'Umar Abd al-Barr.⁵³

Ib'n Bashkuwal (d. 578/1183), al-Marfākushī⁵⁵ (d. 620/1223) Ibn al-Abbār⁵⁶ (d. ca. 658/1260), Ibn ad-Dawādārī⁵⁷ (d. 732/1331) and aṣ-Ṣafādī (d. ca. 797/1394) had also used the *Ṭabaqāt* of Ṣā'id.

Shamsuddīn adh-Dhahabī (d. ca. 743/1343) has copied two passages from Ṣā'id bearing on the biography of Ibn Ḥazm, mentioning him as Ṣā'id ibn Aḥmad and Abu'd-Qāsim Ṣā'id.

The Maghrebī writer al-Maqqarī (d. 1041/1632) used the *Ṭabaqāt* as his source for the history of the scientific activities in Andalusia in the 5th /11th century⁶⁰ without acknowledgement.

Hājji Khalīfah (d. 1067/1657) characterizes this book as a "slender volume of great utility" and copies a long passage from it on the development of Arab astronomy under Caliph al-Ma'mūn.

This book of Ṣā'id was also quoted by Tashykoprüzādeh⁶² (d. 968/1560), Nūrullāh al-Shustarī⁶³ and Rashīd Raḍā.⁶⁴

The Amīr of Algeria 'Abdu'l-Qādir copied information about the development of science in the world from Ṣā'id in his book *Dhikrā al-Ghāfil* without acknowledgement.

Muḥammad Kurd 'Alī quoted three long passages from this book on the Muslim scientists of Spain in his book *Ghābir al-Andalus wa Ḥādiruha*.

Two extracts from the *Ṭabaqāt* are quoted by 'Umar Farrukh in his *Ta'rikh al-Fikr al-'Arabī ilā Ayyām Ibn Khaldūn* (1386/1966) regarding the subjects studied by the Arabs in pre-Islamic times.

A Critical and thorough study on this book is that of Martin Plassner, published in 1956.⁶⁷ A modern historian George Sarton states that the *Ṭabaqāt* is of considerable interest from his point of view because it "paid special attention to the history of science".⁶⁸ Regis Blachare has also published a critical appreciation of this book in *Hesperis*.⁶⁹ Lutz Richter-Bernburg has published a thorough study on Ṣā'id and his

contribution to the construction of *Toledian Tables* and his history of sciences in Andalusia.

Khairullāh the author of the *Ḥaḍārat al-'arab fi'l-Andalus*⁷¹ (Baghdad, 1397/1977) mentions the *Ṭabaqāt* as a source for the intellectual history of Andalusia.

Anwar G. Chejne in his *Muslim Spain : Its History and Culture* has not only used the *Ṭabaqāt* as a source for his book⁷² but also gives a short but critical analysis of its contents.

DEMERITS

The first five chapters of *Ṭabaqāt* are considerably bigger and are substantia while other chapters are brief and superficial. The quality and quantity of information about the eight nations were uneven which indicates that all eight chapters are not of equal value and importance.

Moreover, this book does not contain any account of the general development of science among the different nations specially when mathematics, astronomy and medicine were much developed at the time of Ṣā'id's writing this book, but it may be stated that the development of philosophy and science is outlined in the chapter on Greece (*al-'Ilm fi'l-Yūnān*).⁷³

The appalling demerit of this book is its chronological errors and historical anachronisms which are most serious in the chapter on Greek Sciences and philosophy. Ṣā'id showed a complete ignorance of time sequence and committed serious errors. For example, his statement that Empedocles lived before Pythagoras is incorrect. Modern researches have established that Pythagoras died about 480 B.C. while Empedocles⁷⁴ died around 432 B.C. Similarly, the order of priority in which Ṣā'id mentions Euclid and Apollonius of Perga is incorrect. According to modern research Euclid flourished around 295 B.C. while Apollonius died in early second century B.C.⁷⁵ Another serious error is about the life and times of Galen. Ṣā'id stated that Galen lived six hundred years after Hippocrates and five hundred years after Alexander the Great. This is an error committed by al-Mas'ūdī which Ṣā'id copied from the *Tanbīh*. According to the results of modern research Hippocrates died in 380 B.C. and the date of Galen's death is 199 A.D.⁷⁶

These errors of chronology are perhaps due to his sources. He had no opportunity of testing and verifying the accuracy or authenticity of his written sources. The errors found in the works of al-Mas'ūdī and Ibn an-Nadīm are also found in this chapter, and al-Qifī⁷⁷ and others followed Ṣā'id.

Pythagoras could not have acquired philosophy from the disciple of Solomon, son of Prophet David as stated in the *Ṭabaqāt* because Solomon and David were the kings of Israel and lived centuries earlier. His statement that Socrates studied metaphysics is also incorrect⁷⁸. Generally speaking, he was interested in man, nature and ethical philosophy and he did not discuss metaphysics. Plato and Aristotle concerned themselves with metaphysics.

Moreover, Ṣā'id stated that Aristotle was the son of Nicomachus of Gerasa which is incorrect. The name of Aristotle's father was Nicomachus,⁷⁹ no doubt, but Nicomachus of Gerasa was a different person.

ṢĀ'ID IMPARTIALITY AND OBJECTIVITY

One of the merits of this book is that its approach is objective and impartial above all kinds of prejudices. Seldom does Ṣā'id allow his personal beliefs and ideas cloud his judgement. He wrote the book when Catholic Christians of the north had started a counter-offensive against Andalusia attacking and conquering the Islamic States and massacring the Muslims, after having conquered Cordoba⁸⁰ in 423/1031, like the killing of the Muslims in Iraq and Persia by the Mongols in the middle of the thirteenth century. Moreover, Ṣā'id included two chapters in his book dealing with the contributions of the Indians and Jewish (Israelite) scientists to the development of science.

CRITICAL APPROACH

Ṣā'id's approach is generally critical and he was particular in pointing out where he differed from the theories and views of the philosophers and scientists recorded by him in which he did not spare even his teacher Ibn Ḥazm. He criticized ar-Rāzī for his belief in dualism, his rejection of Prophethood like the Brahmins and his faith in matempysocosis like the Sabeans. Being a follower of Aristotle, Ṣā'id took ar-Rāzī to task for his criticism of Aristotle.⁸¹ He criticized al-Kindī,⁸² pointing out the complete absence of analysis in his logic, which he considered necessary, and put forward arguments in its favour. While admitting that Ibn Ḥazm was a great authority on Jurisprudence, he stated that his book on logic is full of obvious errors.⁸³ He criticized his compatriot al-Majrīfī for not correcting the errors when he reconstructed the astronomical tables of al-Khwārizm.⁸⁴ Ṣā'id claimed that the errors of the astronomers which corrected by him in his *Kitāb Iṣlāḥ Ḥarkāt an-Najūm* (Book-Concerning the Corrections of the Movements of Stars) which is not extant.⁸⁵ He had also corrected in this book the errors committed by Abū 'Abjullāh ibn Aḥmad of Saragossa in his *Risāla* which discussed the errors of the Indian system of astronomy called *Sindhind*.⁸⁶ It suggests that he agreed with the astronomical theories of Brahmagupta⁸⁷ contained in his *Brāhmasaḥaṭasiddhānta*.

CONCLUSION

It may be asked: for whom did Ṣā'id write this book and what kind of readers were in his mind? His main object was to broaden the intellectual horizon of his readers. It would not be incorrect to state that Ṣā'id wrote this book for general readers as well as for scientists and historians, because generally and normally, he maintained in a low key all discussions of purely scientific subjects in every chapter.

Like Ṣā'id al-Bīrūnī was also a scientist and historian of science and the latter wrote a substantial book on chronology and eras but it is almost certain that none of the works of al-Bīrūnī was available to Ṣā'id at Toledo. A comparison between Ṣā'id and al-Bīrūnī will establish that the latter far surpasses the former in scientific knowledge and accuracy. It is a fact that a large number of books were available to al-Bīrūnī in the East, but Ṣā'id always faced the serious problem of dearth of books at Toledo. As a result, the *Ṭabaqāt* is not as thorough and complete as the works of al-Bīrūnī.

A critical and correct edition of the *Ṭabaqāt* is still a long-felt necessity. Moreover, the full text of the book has not been found yet. Several passages, in the works written and compiled after Ṣā'id which quoted from the *Ṭabaqāt*, are not found in any of the printed texts or the manuscripts extant now. For example a passage denying the burning of the library of Alexandria by the order of 'Umar, the second Caliph, has been recorded by at least two authors, quoting the *Ṭabaqāt* but this passage is not found in the present printed texts and manuscripts. For this reason, a more comprehensive and correct assessment about this book can be offered only when a full text is discovered and published.

Like al-Mas'ūdī, Ṣā'id was also a humanist and a rationalist. Both had genuine scholarly and human interest in the civilization of the ancient nations specially the Greeks and Indians. They provide knowledge about non-Muslims to the Muslims as was done by al-Bīrūnī (d. ca. 442/1050) in the case of India. Al-Mas'ūdī and Ṣā'id gave information about the Hebrews, the Indians, and Persians, the Greeks, the Romans, the Egyptians and the Arabs as al-Bīrūnī, in his *Kitāb al-Hind*, gave a detailed account of the society, culture and civilization of India. All three attempted to record the history of the civilization and culture of non-Muslims. Al-Mas'ūdī, al-Bīrūnī and Ṣā'id represent the best tradition of muslim humanism which contributed substantially to the birth of European humanism.

I am obliged to Professor Paul Kunitzsch of Munchen, Germany for all possible help in writing of this paper. Thanks are also due to Professor Gregg de Young of the American University Cairo for his valuable suggestions.

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2. See the *Ta'riḳḩ al-Ḥukamā'* edited by Julius Lippert (Leipzig, 1903) and the '*Uyūn al-Anbā' fī Ṭbaqāt al-Aṭibbā'* edited by Nizār Raḍa (Beirut, 1965).
3. Ibn bashkuwal prefers "*Ṭaḡḩab*". See *Aṣ Ṣilah fī Ta'riḳḩ A'immat al-Andalus* edited by I.A. al-Ḥusainī, (Cairo, 1955). Vol I, p. 232. No. 539.
4. Ibn al-Farādī, *Ta'riḳḩ al-Ulamā' bīl-Andalus* edited by I.A. al-Ḥusainī (Cairo, 1954) I, p. 43 and Ad-Ḍabbī, *Buḡyat al-Multamīs* ed. by F. Codera and Julian Ribera (Madrid, 1884) p. 343 (No. 980).
5. See the chapter entitled "Al-'Uloom fil-'Andalus" in the *Tabaqāt al-Umam* ed by Luis Cheikhō (Beirut 1912), pp 62-87 especially pp. 73-76 (Henceforth referred to as *CTU*.)
6. R. Arnaldez, "Ibn Ḥazm", *Encyclopedia of Islam*, Vol III (new ed 1971) pp. 790-799. Ibn Bashkuwal mentions Ibn Ḥazm as one of the teachers of Ṣā'id see ad-Ḍabbī, Henceforth *EI(N)*.
7. On Ibn al-Waqqāshī see ad-Ḍabbī, *op. cit* 470 (No. 1426); Al-Zirekli, *al-A'lām* 3rd ed. (Beirut, 1969). Vol IX, pp. 80-81 where his name is recorded as abu'l-Walīd Ḥiṣḩām ibn Aḩmad ibn Ḥiṣḩām ibn Kḩālīd al-Kinānī known as Ibn al-Waqqāshī.
8. *CTU*, p. 74.
9. David Wasserstein, *The Rise and Fall of Party Kings politics and Society in Islamic Spain 1002-1086* (Princeton University, 1985) pp. 338; see 'Abdu'r-Rahmān 'Alī al-Ḥājji, *At-Ta'riḳḩ al-Andalusī* (Beirut : Dar al-Salam, 1396/1976) pp.605;-----, *At-Ta'riḳḩ al-Andalusī min al-Fath al-Islāmī Ḥattā Suqūt Ḡḩarnātā* (Andalusian History from the beginning until the Fall of Granada) (in Arabic), (Damascus, 1396/1976) pp. 330-332 and 367-369; they were called *Mulūk al-Tawā'if*, *Los Reyes de Taifas*, belonging to the three ethnic Muslim groups the native Spaniards, Arabs and Berbers
10. For Ṭulayṭila (Toledo) and other places in Andalusia see Md. 'Ināyatullāh, *Undulus kā Ta'riḳḩī Jughrāfiyah* (Lahore reprint, 1987 in Urdu, pp. 514+10) See P.G. Thery, *Toledo, Grande Ville de la Renaissance Medievale* (Oran, 1954). For literary and scientific activities in medieval Toledo see Thoms F. Glick, *Islamic and Christian Spain in the Early Middle Ages* (Princeton 1979), pp. 245, 250, 253, 257, 260-263 and passim.
11. D.M. Dunlop, "the Dhunnūnids of Toledo" in *Journal of the Royal Asiatic Society of Great Britian and Ireland*. (London, 1942) pp. 77-96; - - - "Notes on the Dhunnūnids of Toledo". Ibid (1943) pp 17-19; David Wasserstein *op. cit.* pp.127-128; 253-254 and passim See also D.M. Dunlop's article on this dynasty in the *Enc. of Islam* new ed. (1965) Vol. II, pp. 242-243.
12. Ibn bashkūwal, *op. cit.* I, 232; ad-Ḍabbī, *op.cit.* no. 852, p.311.
13. On Ibn al-Ḥadīdī see *Encyclopedia de l' Islam*, IV, p.853. (Ref. R. Blachere's French Translation).
14. Isaac Israeli, *Liber Jesod Olam seu Fundamentum Mundi* edited by B. Goldberg and L. Rossenkranz 2 Vols. (Berlin, 1946-48).
15. Martin Plessner, "Der Astronom und Historiker Ibn Ṣā'id al-Andalusī und seine Geschichte der Wissenschaften" in *Revista degli Studi Orientali* (Rome, 1956) Vol. 31 pp. 325-357.
16. Lutz Richter-Bernburg, "Ṣā'id the Toledan Tables and Andalusī Science" In *From Deferent to Equant : A Volume so Studies in the History of Science in th Ancient and Medieval Near East in Honour of E.S. Kennedy* ed. by David A. King and George Saliba (New York, Academy of Sciences, 1987) pp. 373-402.

17. Cf. Ibn Ḥazm's well-known work *Kitāb al-Faṣl fī'l-Milal wa'l-Ahwā' wan-Niḥal*
18. M. Casiri, *Bibliotheca arabico-hispana Escorialensis*, 2 vols. (Madrid, 1760-1770), II, 142. See also C. Brockelmann *GAL I* (1943) pp. 418-419, *SI* (1937) pp. 558-586.
19. One Published by Maḥmūd 'Alī Ṣubayḥ of Cairo, pp. 120 and the other by the Sa'ādah Press of Cairo. Both are not dated.
20. See *Ṭabaqāt al-Umam* with an Introduction by Syed Md. Baḥr al 'Ulūdīm (Najaf, 1387/1967) pp. 117.
21. Edited bny Hayāt Bū'Alwān of the American University of Beirut (Beirut: Dar at Tali'Ah lit-tabā'at wan-Naṣhr, Febr 1985) pp. 216 (full of errors)
22. See M.S. Khan, Proposal for a new edition of Qādī Sā'id the Islamic Quarterly Vol. XII/3 (London, July-sept. 1967) pp. 125-139. The Chester Beatty Library, MS bears the No. 3950: National Library, Cairo. Ta'riḫ Ṭalat No. 1821, and Sulaymaniye Kutuphanesi. Ra'īs al Kuttāb no. 668.
23. *Ṭabaqāt al-Umam* (Maarif Press, Azamgarh 1346/1928) pp. 150.
24. French translation with an Introduction, notes and indices (Paris, 1935) p. 192. For a review of this translation see *Islamic Culture* (Hyderabad, 1929) III, pp 157-58.
25. In 1310 A.H. Shamsi p. 158; see also Said Nafisi, *Dar Pysramun-i Tarikhi Tarikhi Bayhaqi* (Tehran 1342) I, 473; II, 849-50.
26. Joshua Findel, An Eleventh Century Source for the History of Jewish Scientists in Mohammedan Lands in *Jewish Quarterly Review*, N.S. Vol XVIII (1927-28) pp. 45-54.
27. i) Khan M.S. "An Eleventh Century Hispano-Arabic Source for Ancient Indian Science and Culture" in the Prof. H.K. Sherwani Felicitation Volume (Hyderabad, 1975) pp. 356-389.
 ii) A chapter on Ancient Persia in an Eleventh Century Hispano-Arabic work in the Iran Society Silver Jubilee Souvenir, 1344-4669 (Calcutta, 1970) pp. 213-230. For a revised version of this paper see *ZDMG*. Vol. 144/I (1994) pp. 33-55.
 iii) A chapter on Ancient Chaldean Sciences in an Eleventh century Hispano-Arabic work in the *Islamic Quarterly* (London, June, 1972) vol. XVII/1, 2, pp. 12-35.
 iv) A chapter on Roman (Byzantine) Sciences in an Eleventh Century Hispano-Arabic Work in *Islamic Studies* (Islamabad, Spring, 1983), Vol. XXII, pp. 41-70. A
28. David Pingree, "Brahmagupta" in *DSB* Vol. II (1981) pp. 416-418. Ibn al-Abbar, op. cit. no. 1334, Vol. I, p. 366; al-Maqqari, Vol. I, p. 905.
29. See *Ṭabaqāt* ed. by Bu Alwan (Beirut, 1985) Introduction pp. 29-30. Where references to primary Sources are given in the foot-notes.
30. There seems to be a difference between Ibn an-Nadīm and Sā'id in that the former was interested in scientific books while the latter's interest lay in several fundamental sciences and scientists.
31. See M.S. Khan's paper mentioned in note 27 above.
32. Mario Grignaschi, "Al-Fārābī et l'Épître sur les Connaissances à acquérir avant d'entreprendre l'étude de la philosophie" in the *Turkiyat Mecmuası* Vol. 15 (Istanbul, 1966) pp. 175-210. See *Fī ma- Yaḥbaghū an Yuqaddama qabla ta'allumil-Falsafah*. See its text edited, translated and published by F. Dietrich in *Alfarabī Philosophische Abhandlungen* (Leiden, 1890-92) pp. 49-58.
33. *CTU*, p. 28 See Ibn al-Qifī, op. cit. p. 63 Where Sā'id's statement is copied. Al-Qifī mentions *Kitāb Aghrād Kitāb Uqūdas* as one of al-Kindī's works on Geometry (p. 371) which he copied from Ibn an-Nadīm, op. cit. I, p. 257.

34. Edited by Fe'ād Sayyid (*Les Generations De Medecins Et les Sages*) (Cairo, 1955) with Arabic and French Introductions pp. 10+138; see Juan Vernet: "Los Medicos Andaluces En El Libro de Las generacione Madicos De Ibn Yulyul" in *Anuario de estudios Medievales* No. 5 (Barcelona, 1968) pp. 445-462; Ibn al-Qifī, *op. cit.* p. 190.
35. *CTU*, pp. 58-60; For Ibn Yūnus (d.388/100) see Fu'āt Sezgin, *GAS*, Vol. VI (Leiden, 1978) pp. 228-231. For Ibn al-Haytham (d. Cairo, 432/1041) See Fu'āt Sezgin, *op. cit.* pp. 251-261. David A. King, "Ibn Yūnus", in *DSB* Vol. XIV (New York, 1981) pp. 574-580, A.I. Sabra, "Ibn al-Haytham", in *DSB*, Vol. VI. (New York, 1981) 189-210. See the other monumental works of A.I. Sabra on Ibn al-Haytham in *DSB*, vol vi (New York, 1981), 189-210.
36. *CTU*, pp. 10-11 under the caption *al-'Uman al-Latī 'Unīyat bi'l-'Ulōm*, on *Nations who Cultivated Sciences*. Among those who did not cultivate sciences the Gog, Magog, Bulgars, Russians, Chinese Berbers, Sudanese, Nubians, Ghanians and others are mentioned.
37. *CTU*, p.8
38. See the introduction to the Beirut (1985) edition of the *Ṭabaqāt*, p. 26.
39. See a thorough study of this chapter by M.S. Khan, "An Eleventh Century Hispano-Arabic Source for Ancient Indian Sciences & Culture" in the *Prof. H.K. Sherwani Felicitation Volume* edited by P.K. Joshi and M.A. Nayeem (Hyderabad, 1975) pp. 356-389.
40. See *CTU*, pp. 50-51; M.S. Khan's forthcoming paper "Šā'id's Account of the Introduction of Greek Sciences among the Arabs" based on the *Ṭabaqāt*.
41. See *CTU*, pp. 5-11.
42. *CTU*, pp. 38-39.
43. *CUT* p. 69 Said records that he made those corrections in his book *Kitāb fi Iṣlāḥ Ḥarkāt an-Nujūm wa'l-Ta'rif bi Khaṭā'ar-Rāsidīn* (*Book on the Corrections of the Movements of Stars and an Account of the Errors Committed by the Astronomers Making Observations*).
44. *CTU*, PP. 72-73.
45. See M.S. Khan, "Qāḍī Šā'id on the Practice of Greco-Arab Medicine in Medieval Andalusia" in *Hamdard Medicus* (Karachi, Oct-Dec., 1993) Vol. XXXVII, pp. 101-115.
46. See Bernad R. Goldstein, "The Survival of Arabic Astronomy in Hebrew". *Journal of the History of Arabic Science* (Aleppo, 1975) Vol. III, pp. 31-39. M.S. Khan, "Qāḍī Šā'id's Account of Medieval Arab Astronomy" in *Islamic Culture*, Vol. 54 (1980) pp. 153-159. See Murtin Plessner's paper mentioned in note 15. Its English translation by M.S. Khan will be published soon.
47. "Ibn Abī Uṣaibi'a – his great work called '*Unyūn al-Anbā' fi Ṭabaqāt al-Aḥibbā'* has reproduced several biographies of physicians, the text of which has been taken from Šā'id's work". See R. Blachere, "al-Ṭalāṭilī" in the *First Enc. of Islam* (Brill Reprint, 1987) p. 831.
48. See edition cited pp. 272, 280 and 282 where references to Šā'id's work have been given. R. Blachere states "Ibn al-Qulī borrowed largely from the *Ṭabaqāt al-Uman* and it can be estimated that the parts taken from this work form a good quarter of his *Ta'riḫ al-Hukamā'*." See "al-Ṭalāṭilī" in loc. cit.
49. Edited by Šāliḥānī (Beirut, 1890), Reprint 1958, pp. 93, 135-36. In this book the division of peoples into those who studied sciences and those who did not, has been borrowed from the *Ṭabaqāt*.
50. Edited by F. Wüstanfeld (Göttingen, 1840) Vol. II, p. 71 No. 716. Eng. trans by De Slane, *Ibn Khallikān's Biographical Dictionary* (London, 1843), Vol III, p. 308

51. Edited by D.S. Margoliouth, 7 Vols. (London, 1923-1926); Fuat Sezgin, *GAS* VI, Vol. V, p. 84; Vol. VI, p. 82. At both places, Ya'qūb calls him Qādī Šā'id al-Jayyānī or hailing from Jaem which is not correct.
52. See his *al-Mughrib Fī Ḥula al-Maghrib* ed. by Shawqī Daib (Cairo, 1943) 2 Vol. Vol. I, p. 120; Ch. Pellat, "Ibn Šā'id al-Mughribī," *Et (N)* Vol. III (1971) p. 926.
53. In his *Tadhīl* to Ibn Ḥazm, Ibn Sa'id refers to this work of Šā'id. See al-Maqqarī, *Nafh at-Ṭib* (Leiden, 1855-1860), Vol. II, p. 123. See *Faḍā'il al-Andalus wa Ahluha* by Ibn Ḥazm, Ibn Sa'id and others edited by Salāhuddīn al-Munajjid (Beirut, 1387/1868) p. 24.
54. *Loc. cit.* in note 3 above.
55. *Al-Mu'jib ib fi Talkhībār ahl al-Maghrib* by 'Abdu'l-Wa-ḥid al-Marrākashī, Egyptian edition pp. 4, 26 and 206.
56. See his *Kitāb at-Takmilah li Kitāb aṣ-Ṣilah* ed. by F. Codera, Alfred Bel and M. Ben Cheneb, (Algeria, 1920) pp. 164, 246, 247 and passim (notes).
57. *Kanz ad-Durar wa Jāmi 'al-Ḥurur*, Vol. IX, ed. by Hans Robert Roemer (Cairo, 1960), German introd. p. 15.
58. As-Šafadī, another Syrian scholar mentions the *Tabaqāt al-Ḥukanā'* by Abu'l-Qāsim bin Šā'id al-Qarṭubī; see his *Kitāb al-Wāfi bill Wafāyāt*, ed. by Hellmut Ritter (Wiesbaden, 1381/1962), I, 54.
59. *Kitāb Tadhkirat al-Huffāz* (Hyderabad, 1376/1957) Vol. III, pp. 1147-48. The biography of Ibn Ḥazm copied, but reference to the *Tabaqāt* not given
60. *Nafh at-Ṭib...* (Leiden, 1855-60), 2 Vols. 105, II 123, 323.
61. *Kashf aṣ-Ḍunūn*, Flügel ed. Vol. II, p. 318, No. 3091 where he is mentioned as al-Māliqī belonging to Malaqa which is incorrect
62. *Miftāḥ aṣ-Sa'ādah* (Hyderabad, 1328/1910). I, 218.
63. *Majālis al-Mu'minīn*, Asiatic Society, Calcutta Ms No. 276 (E. 172) p. 387. see W. Ivanow, *Concise Descriptive Catalogue of the Persian MSS in the Collection of the Asiatic Society of Bengal* (Calcutta, 1924) p. 116.
64. *Ta'rīkh Shāikhī Md. 'Abduhū* 1st ed. (Cairo, al-Manār Press, 1350/1931) Vol. I, p. 353.
65. See R. Blachere, "Introduction" to the French Translation p. 24 note 8.
66. R. Blachere. *loc. cit.* note 9. Thorough study of the Chapter on Greek Sciences and philosophy will be published soon
67. See note 15 supra.
68. See Sarton. George. *Introduction to the History of Science* (Baltimore, 1927), Vol. i, pp. 776-777.
69. See his "Une Source de l'histoire de sciences chez les Arabes, les *Tabakāt al-Umam* de Saïd al-Andalusi" in *Hesperis* Vol. VIII (1928) pp. 357-61.
70. See note 16 supra.
71. (Baghdād, Dār al-Hurriyah. 1397/1977) p. 144.
72. (Minneapolis : University of Minnesota Press, 1974) pp. 176-179 and 269. Juan G. Vernet (Barcelona) has used the *Tabaqāt* as a source for his *La Cultura Hispanoarabe En Oriente Y Occidente* (Barcelona: Ariel, 1978) pp. 395 at pp 27-78 and passim.

73. *CTU*, pp. 19-33; Ḥayāt Bū'Alwān edition, pp. 70-96.
74. It has been stated in a paper by S.M. Stern that the book *al-Abad'ala al-Amad* by Abu'l-Ḥasan al-'Amirī was the only source of Ṣā'id's (died ca 432 B.C.) by Alexander P.D. Morelatos. in *DSB*, Vol. IV (1981) pp. 367-369.
75. On Euclid (fl. ca. 295 B.C.) see Iver Bulmer-Thomas in *DSB* Vol. IV (1981) pp. 414-437; Fu'āt Sezgin, *GAS*, vol. v (1974), pp. 83-130, Apolgonius of Perga, See J. Toomer, *DSB*, Vol. I (1981) pp. 179-193; Fuat Sezgin, *op.cit.* pp. 136-143.
76. For Hippocrates of Cos (d. Ca 370 B.C.) see Robert Joly in *DSB* Vol. VI (1981) pp. 418-431; Fu'āt Sezgin, *GAS*, Vol. III (1970) pp. 68-140. Concerning Galen, See L.G. Wilson. *DSB*, vol. v. (1981), pp. 227-237.
77. See above for the errors of al-Mas'ūdī and Ibn an-Nadīm found in Ṣā'id and al-Qifī.
78. Socrates not included in the *DSB*. See "Suqrat" in the 1st edition of the *Enc. of Islam*.
79. For this Nicomachus who flourished around 100 A.D. see Leonard Taran in *DSB*, Vol. V (1981) pp. 112-114. Fuat Sezgin, *GAS*, Vol. V (1974) pp. 164-166.
80. The last Caliph of Cordova was Hishām (III) bin Muḥamad bin 'Abdu'l-Mlik bin 'Abdu'l-Raḥmān III called al-Mutadid 420-422/102 -1030. See the works of 'Abdu'l-Raḥmān al-Ḥājī on the history of Andalusia, mentioned in note of Maḥmūd Makki. "The Political History of al-Abdulus" In *The Legacy of Muslim Spain* ed. by Salma Ḳhadrā Jayyūshī (Leiden: Brill, 1992) pp. 3-87.
81. *CTU*, p. 33; Ṣā'id does not mention ar-Razi's works in which he criticized Aristotle. It is not known whether his *aṭ-Ṭibb ar-Rūḥānī* and *al-'Ilm al-Ilāhī* were available to him at Toledo or not
82. *CTU* p. 52, a reply was given by Ibn Abī Uṣaybi'a, *op.cit.* p. 208. On al-Kindī see 'Abdu'r-Raḥmān Shāh Wali, *Al-Kindī wa Ārā'uh al-Falsafiyah*, Islamic Research Institute, (Islamabad, 1394/1974), pp. 485. George N. 'Aṭīyah, *al-Kindī The Philosopher of the Arabs* (Rawalpindi, 1966) pp. 272.
83. *CTU*, p. 76. Ṣā'id attacks Ibn Ḥazm because in his *Kitāb al-Taqrīb li Hudūb al-Manṭiq* he criticized certain parts of the Aristotelian logic. See Franz Rosenthal, *The Technique and Approach of Muslim Scholarship*, *Analecta Orientalia*, XXIV (Rome, 1947) pp. 54-55.
84. *CTU*, p. 68, for al-Majrīṭī, see Fu'āt Sezgin, *GAS*, Vol. VI (1978) pp. 226, 226 Juan Vernet, "Al-Majrīṭī," *DSB*, Vol. IX (New York, 1981) pp. 37-40. See E.S. Kennedy, *op. cit.* No. 21, pp. 128, 148-150 (The *Zij* of al-Ḳhwārizmī); "al-Ḳhwārizmī" by Fu'āt Sezgin, *GAS* Vol. VI pp. 140-143; J. Vernet, "Al-Ḳhwārizmī in the *El (N)*, Vol. IV (1978) pp. 1070-1071; G.K. Toomer, "Al-Ḳhwārizmī" in *DSB*, Vol. VII 1981, pp. 358-365.
85. *CTU*, pp. 58, 69. This book of Ṣā'id has been mentioned by Ḥājī Ḳhalīfah and al-Maqqarī
86. *CTU*, pp. 72-73. The *Sindhind* was most probably the Arabic form of the *Brāhmasphuṭasiddhānta* of Brahmagupta and this name was given to his school of astronomy. it was edited by Ram Swarup Sharma, 4 Vols. (New Delhi, 1966). See also M.S. Ḳhān, "Al-Bīrūnī's Knowledge of Indian Astronomy" in *History of Oriental Astronomy*, edited by G. Swarup and others (Cambridge, 1987) pp. 139-145. Note 1.
87. On Brahmagupta see D.M. Bose, Chief Editor, *A Concise History of Science in India* (New Delhi, 1971) pp. 95-97.