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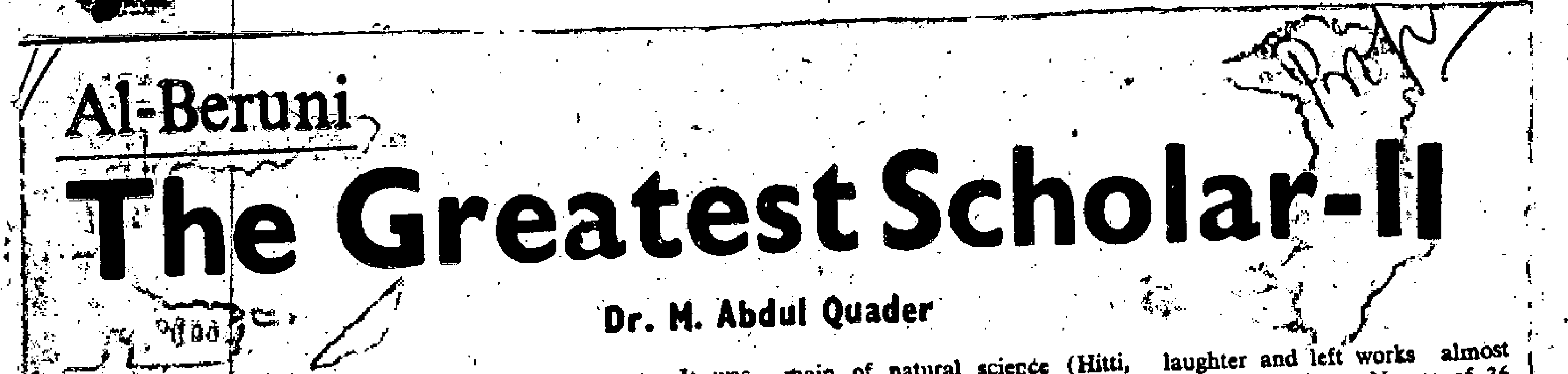

Al-Beruni

The Greatest Scholar-II

Dr. M. Abdul Quader

Masud experienced great troubles in the meantime. The Seljuk Turks began to hammer repeatedly at the gates of Khurasan and he suffered a disasirous defeat at their hands in 1039. He was killed next year by a slave and the blind Muhammad whos elife he had kindly spared ascended the throne. But four months aftrewards he was defeated and killed by Maudud. a son of Masud who became the Sultan in 1040.

He seems to have retained his privileges and prestige under the new Sultan and hence his cultivation of learnnig continued unabeted. He composed two more books at this time named Al-Dastur and kitabuj jamahir martiatij jawahir. It is said that Al-Biruni enjoyed rest only on the day of Naoroj and Sab-i-Barat. His continued studies and writing seriously affected his health which had already deeteriorated by sufferings during his long stay and journey in India. Still he retained his asses till the last moment. Inspite of painful difficulties in breathing he took his lesson about artificial grandmother from Faqir Abul Hasan and repeated it to breathe his lst very next moment. It was Friday the 12th December of 1048—a day covted for by the pious Muslims. He was then aged 75 and may be said to have died almost at he proper age. A Shafaullah Shia Al-Beruni wa conservative in politics and rationalistic in religious and scientific matters. As a man he was very liberal-minded and hence did not like the cruelty of Kabus or plundering raids of Mahmud He was not prepared to accep scientific thing as correct unless proved by the standard of reason. As to the Alchemists he remarked that to speak of silver being turned into gold was the same as converting cotton to metal. Al-Birun: was a many-sided genius—a physician astronomer, mathematician, physicist, Geographer, Historian, a keen critic and scholar of exceptional erudition. "He was perhaps the most prominent figure in the phalanx of those universally learned Muslim scholars who characterised the golden period of Islamic sciences (Arnold and Guillaume, legacy of Isla[illegible] 332.".

He regarded as "the most original and profound scholar produced by Islam in the domain of natural science (Hitti, A short history of the Arabs, 376).

In the opinion of serton he was a great Muslim scientist and verything considered a great scholar of any age. Vincent Smith regards him as one of the most learned scientists whose history makes mention, while Sachau hails him as the greatest scholar of the world.

Al-Beruni was a great linguist and a versatille genius. It was chiefly the age of gathering knowledge from foreign languages through translation. Hence the more a person was expert in as many lnguages as possible it was easier for him to acquire more learning and leave more contribution behind. In this respect Al-Beruni was probably the greatest person in the Muslim world. Just as his combination of words and technique of composition in Arabic is Praiseworthy, so also his translation of Kitabul Tahseem bears testimony to his profound knowledge in Parsian, Turkish, well-acquainted with Arabic, Greek and Syriac he made himself a complete master of Sanskrit. To day it is beyond all inqisation and conception to comprehend how much extra-ordinary forbearance, intelligence, inquisitiveness and mental capacity were required to lesson an absolutely unknown dead language from works usually written in poems full of alliteration by living in a distant foreign land in the midst of a hostile population alien in race and religion. He knew poetry, theology, history, geography, philosophy, logic, astronomy, astrology meteriology, chemistry, botany, antequarinism, medicine, mathematics and what not. He could write nice poetry prose king laughter and left works almost on every subject. Names of 36 books by him have come down to us. Of them only 12 or according to some 27 are extant. They include Al-Qanun Al-Masudi fil hayah wannuzum Tahqia Ma lil Hind min maqulah an qabulah fil aal ao marjulah (book) regarding an accurate description of all categories of Hindu thought admissible to reason or not), briefly, known as kitabul Hind, Kitabul Tafheem, Kitabul Jamahir fi mrifatij jawahir, kitabus savdal fit-tib.

Al-atharul Bagich Al-Qurunul Khal yah, Najhtul afar, Kitabuddur, Makalatun-fi Jahmaisa Sadati walgaib, Istiabul Wajuhil jumk na fi tanheelit tasteehil ustarl walamal and Tiajif fi rashikatul Hind of these eight have been edited and printed and some translated into English. German and Bengali. 20 more have been party edited or translated and published. Most of his mathematical works and many other writings, however are waiting for publication. A voluminous unedited lapidary by him is extant in a unique manuscrit in the Escurial library. It contains description of a large number of stones and metolds from tmura, commercial and medical point of view. He composed moreover a pharmaelology (Saydala), Important informations could certainly be had from his unedited works on the origin of Indian and Chinese stones which appear early in Arabic scientic works.

To appreciate his merit it is necessary to discuss the subject matter of some of his works. In Kitabuj Jamahir he determined the specific gravity of 18 metals and precious stones. This is his greatest contribution to the history of natural science.

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His determination is more correct than that of some scientists of the last century. He was the first to prepore the table of specific gravity, kitabul Hind consists of two parts and is divided into 80 chapters. In this huge encyclopaedia he discusses the religion, philosophy puranic literature, Worship and festivals, manners and customs and judicial system and other matters of the Hindus besides Budhism and Jainism. The impartiality with which he made comparative criticism of different religions and the liberatily with which he shiate with leanings compared them with Islam without caring for theobjection of the Muslims by sitting at the capital of an Orthodox Muslim Ruler has no precedent in history. His description of Hindu Philosophy also bears no comparison Such an impartial discussion simply for the purpose of knowing is the first of its kind in the world. At the same time the composition of such a work for the very man who is blamed as an breaker stands as a testimony to his libera mind and open heart as well. Kitabul Hind is the first direct knowledge of the Muslims about Hindustan and the first successful attempts to make the outside world acquainted with the Hindus and their sciences and letters He sincerely acknowledged the dificiency, if he failed to understand anything in whole or in part. Such an absence of prid and the courage of confessing personal weakness are rarely seen.

Qanunul Masudi is the greatest contribution of Al-Biruni on Pure science. While discussing astronomy he carried trigonometry for above the known level. By criticising the views of Ptolemy and Vakub he determined the value of the are of a degree upto the fourteenth fraction of the decimal. In his table he also gave the sum of a quarter (15) of every degree. To accomplish this it is necessary to determine the tangent of 1|3 of an arc. Al-Biruni extrected this by solution of cubic equation with immense labour and perseverance.

He also discussed the problem of dividing an angle into three equal parts. An are that its mathematical solution is impossible he resorted to mechanical method and thereby determined 15 of a degree as 1.9z-49. 51 48 49 51 48.

This is correct upto the lenth place of the decimal. The measurement acknowledged at present as most precise is 19zi 49ii 57ii 48iv 25vi 27vii which differs very little from that of Al-Biruni for calculation of ¼ (15" minute) of adequre in a general way he used the method of proportionate parts which is being followed also to-day. For minute and precise calculation he inventedthe formula of interpolation an honour wrongly attributed to newton. By applying this he even prepared a general list which is correct upto the 7th place of the decimal amount of mistake in it is less than 1|107th. If calculation is made in accordance with his formula the mistake becomes less than 3|107 more minute calculation is not made even at present. How an angle is to be determined when sine is known He skil fully determined even that.

By regarding 60 as aunit instead of measurement of the redius of a circle he was able to give Geometrical explanation of the relations of trigonometry and preface Table of Tangents by the application of both the methods above. He disconnected also the relation between tangent and greman and declared that whatever may be the length of the greman the shadow will be obtained when that is multiplied by the attitude tangent of its complementary.

He set the example of his Interpolation. Theory can be used in a general way. There is no evidence of the use of the lauguge of the Theory of teme ter before him. For solution of the plan sphericul triangle he devised for the first time the formula of sin A=Sin B. Nasiruddin Qaisar regenovator of Trigonometry applied exactly the very method 250 years afterwards Four relations of the spherical right-angled triangle were known to the Greeks Al-Beruni gave a new shape to it by inventing more. These are cos A—Cos a Sin B and Cos C=Cot —Cot B.

The Fourth part of Qanunul Masudi is chiefly cilled with astronomical discussion.. The measurement of a degree he obtained by conducting his experiment from the Hindukosh differs very little from the measurement determined at the present time. This difference too rose for not taking into consideration the reflection of the mirror. If angitude latitude latitude altitude etc. two be known he devised the easy process for determininng others He calculated the correct latitude and longi hide of 29 places including Lahore, Kanauj Kalanjar and Ceylon and discussed the question of the rotation of the earth on its avis. Like Al-Jarkat of Toleds he followed the gescentric theory instead of Helecentric 3000 years before copernicus is wrongly given the 3000 credit due to Al-Biruni.

Al-Asarul Bagutuh science which was first work deals with intelligent discussion about the religious codes festivals methods of calculation of the years of the Assyryans Babylonians and other ancient nations and scientific discusion of Greek Perian and other older civilizations. The sources from which greatest contribution of Al-B he recovered these now-extinct subjects being out of reach of the present-day scientists, they will not be able to improve upon the same. In this light his originality is permanent. The number of works in the world is very rare to do full justice to the work of Al-Biruni it will require the labour of many a generation (Sachau).

Kitabul tafneem (1030) is a short criticism in the form of questionaire for the use of the beginers composed in simple language. It comprises arithematic geometry mumismatics geography astrology astronomy and several other subjects. According to Ramsay wright it is the first Scientific book of the 11th century.