Tracing the Scholars of Islam

Series 19

Banu Musa

The Three Engineer Brothers of the House of Wisdom, Authors of Kitab al-Hiyal



AI-generated image — imaginative depiction, not a real likeness

Hj Che Alim Hj Che Haron
AK (Kelantan)
quranscience.my

© 2026 CE / 1448 AH Hj Che Alim Hj Che Haron AK (Kelantan) • quranscience.my • @QuranDanSains
This eBook is FREE for Muslims — not for sale.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

TRACING THE SCHOLARS OF ISLAM

SERIES 19

BANU MUSA

The Three Engineer Brothers of the House of Wisdom, Authors of Kitab al-Hiyal

قَالَ مَا مَكَّنِّي فِيهِ رَبِّي خَيْرٌ فَأَعِينُونِي بِقُوَّةٍ أَجْعَلْ بَيْنَكُمْ وَبَيْنَهُمْ رَدْمًا

"He said, "That in which my Lord has established me is better [than what you offer], but assist me with strength; I will make between you and them a dam."."

SURAH AL-KAHF 18:95

HJ CHE ALIM HJ CHE HARON

quranscience.my | @QuranDanSains

© 2026 CE / 1448 AH quranscience.my — free eBook. Not for sale.

ACKNOWLEDGEMENT

All praise is due to Allah, who taught mankind to build and to invent. Blessings and peace be upon the Messenger of Allah ﷺ, and upon his family and his Companions.

This eBook is specially dedicated to my beloved wife,

ZAHARAH MOHD LATIF;

my dear children,

MUHAMMAD HAFIZ, NOOR HAZWANI, ABDUL HAKIM, NOOR HIDAYAH, NOR AQILA and **NOR ATIQAH**;

and my sons- and daughters-in-law,

FAZILAH, MALEK, HANIN, FAIRIZAL and **FIRWAN**.

This nineteenth book of Tracing the Scholars of Islam tells the story of three orphaned brothers raised by a caliph, who became engineers, mathematicians and patrons of knowledge in Baghdad. May their story teach us the value of cooperation and the danger of envy.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

ABOUT THE COVER OF THIS EBOOK

The cover of this eBook is an **image generated by artificial intelligence (AI)** — an ***imaginative depiction, not a real likeness*** of the Banu Musa. This label is also printed on the cover. This time the style is a **cutaway drawing**, like an engineer's diagram.

In the centre is a brass **water automaton**, opened halfway to reveal the **floats, conical valves, siphon pipes and gear wheels** inside, with a **brass bird** on top. The **measurement lines** and Arabic letters around it recall the diagrams of ***Kitab al-Hiyal***.

In the background is a **courtyard of the House of Wisdom** in Baghdad with a **fountain** and palm trees, and the **three brothers** studying a scroll of designs together.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

CONTENTS

BANU MUSA — *Introducing the scholars*

1. ASSIST ME WITH STRENGTH — *18:95–96; 34:13*

2. THE AGE: FROM MARW TO BAGHDAD — *Al-Ma'mun, Samarra*

3. WHO WERE THE BANU MUSA? — *Orphans; Sahih al-Bukhari 5304*

4. THE HOUSE OF WISDOM: THE BROTHERS' SCHOOL — *Three specialities*

5. MUSA IBN SHAKIR: A FATHER'S REPENTANCE — *Sahih al-Bukhari 6309*

6. KITAB AL-HIYAL: A HUNDRED INGENIOUS DEVICES — *The float valve*

7. EXAMPLES OF DEVICES IN KITAB AL-HIYAL — *Table of devices*

8. THE PRINCIPLE OF AUTOMATIC CONTROL AND MODERN SCIENCE — *Feedback diagram*

9. WATER, AIR AND GRAVITY: THE SCIENCE BEHIND THE DEVICES — *al-Jathiyah 45:13*

10. THE AUTOMATIC FLUTE PLAYER: A PROGRAMMABLE MACHINE — *The pinned cylinder*

11. THREE BROTHERS, ONE BUILDING — *Sahih al-Bukhari 481, 6011; 5:2*

12. GEOMETRY: MEASURING PLANE AND SPHERICAL FIGURES — *Table of topics*

13. ASTRONOMY AND THE MEASUREMENT OF THE EARTH — *The plain of Sinjar*

14. PUBLIC WORKS AND TRUST: THE STORY OF THE AL-JA'FARI CANAL — *Sahih al-Bukhari 33*

15. PATRONS OF KNOWLEDGE AND TRANSLATORS — *Wealth for knowledge*

16. THABIT IBN QURRA AND HUNAYN IBN ISHAQ — *History note*

17. ENVY AMONG SCHOLARS — *Sahih al-Bukhari 6065*

18. INGENUITY FOR GOOD, NOT EVASION — *Sahih al-Bukhari 2236*

19. THE LEGACY OF THE BANU MUSA: FROM AL-JAZARI TO MODERN ROBOTS — *Legacy diagram*

20. TECHNOLOGY, TIME AND GRATITUDE — *Sahih al-Bukhari 6412*

21. ESTABLISHED REPORTS AND POPULAR STORIES — *Assessing the reports*

22. LESSONS AND CONCLUSION — *Twelve lessons*

GLOSSARY AND REFLECTION QUESTIONS

REFERENCES

SUPPORT & DONATIONS

Colour guide: green box = verses of the Qur'an; gold box = Hadith; brown box = history note (reports from the books of history and biography); blue table = comparison. Underlined blue narrator names can be clicked to open the narrator's page on sunnah.com.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

BANU MUSA

The nineteenth book of **Tracing the Scholars of Islam** tells the story of the ***Banu Musa*** — the three brothers ***Muhammad, Ahmad and al-Hasan***, sons of ***Musa ibn Shakir***, in Baghdad in the 9th century CE. They are famous for ***Kitab al-Hiyal*** (The Book of Ingenious Devices), which describes ***about a hundred*** mechanical devices.

They were also mathematicians, astronomers and ***patrons of the translation of knowledge***. Their story begins with them as ***orphans***.

This eBook explores ***the age of al-Ma'mun***, the story of their father, the contents of ***Kitab al-Hiyal*** and the principle of ***automatic control***, the ***automatic flute player***, their work in ***geometry and astronomy***, public works, the scholars they sponsored, and their legacy down to the age of ***robots and computers***.

Note: The translation of Qur'anic verses in this eBook is that of Sahih International. The grading of each Hadith is stated in the Hadith box. Information from books of history and modern research is **biographical report (not Hadith)** *and is placed in the brown "History Note" boxes. A cover image that shows the scholars is an AI-generated image and is marked as such. Their years of birth are not known precisely.*

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

ASSIST ME WITH STRENGTH

SURAH AL-KAHF 18:95

قَالَ مَا مَكَّنِّي فِيهِ رَبِّي خَيْرٌ فَأَعِينُونِي بِقُوَّةٍ أَجْعَلْ بَيْنَكُمْ وَبَيْنَهُمْ رَدْمًا ﴿٩٥﴾

He said, "That in which my Lord has established me is better [than what you offer], but assist me with strength; I will make between you and them a dam."

Translation: Sahih International — quran.com/18:95

EXPLANATION OF VERSE 18:95

Dhul-Qarnayn said: ***"assist me with strength"***. He built a strong barrier through ***cooperation*** and ***engineering knowledge*** — using blocks of iron and molten copper, as the next verse describes. Tafsir Ibn Kathir 18:95.

SURAH AL-KAHF 18:96

ءَاتُونِي زُبَرَ ٱلْحَدِيدِ ۖ حَتَّىٰٓ إِذَا سَاوَىٰ بَيْنَ ٱلصَّدَفَيْنِ قَالَ ٱنفُخُوا۟ ۖ حَتَّىٰٓ إِذَا جَعَلَهُۥ نَارًا قَالَ ءَاتُونِيٓ أُفْرِغْ عَلَيْهِ قِطْرًا ﴿٩٦﴾

Bring me sheets of iron" - until, when he had leveled [them] between the two mountain walls, he said, "Blow [with bellows]," until when he had made it [like] fire, he said, "Bring me, that I may pour over it molten copper.

Translation: Sahih International — quran.com/18:96

This verse shows that ***knowledge of materials and construction*** is valued in the Qur'an — the very field of the Banu Musa.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

THE HANDIWORK OF THE PROPHETS

SURAH SABA' 34:13

يَعۡمَلُونَ لَهُۥ مَا يَشَآءُ مِن مَّحَٰرِيبَ وَتَمَٰثِيلَ وَجِفَانٖ كَٱلۡجَوَابِ وَقُدُورٖ
رَّاسِيَٰتٍۚ ٱعۡمَلُوٓاْ ءَالَ دَاوُۥدَ شُكۡرٗاۚ وَقَلِيلٞ مِّنۡ عِبَادِيَ ٱلشَّكُورُ ١٣

They made for him what he willed of elevated chambers, statues, bowls like reservoirs, and stationary kettles. [We said], "Work, O family of David, in gratitude." And few of My servants are grateful.

Translation: Sahih International — quran.com/34:13

The Qur'an mentions works made for the Prophet Solomon عَلَيْهِ السَّلَامُ: ***"elevated chambers"***, ***"bowls like reservoirs"*** and ***"stationary kettles"***. The verse ends with the command: ***"Work, O family of David, in gratitude"***. Technology and engineering are ***blessings*** to be shown gratitude for by using them for good. Tafsir Ibn Kathir 34:13.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

THE AGE: FROM MARW TO BAGHDAD

The story of the Banu Musa is closely tied to Caliph ***al-Ma'mun***. Before becoming caliph, al-Ma'mun was governor of ***Marw*** in Khurasan (today in Turkmenistan). After the death of Harun ar-Rashid (193 AH / 809 CE), a ***civil war*** broke out between al-Ma'mun and his brother ***al-Amin***, ending in al-Ma'mun's victory in 198 AH (813 CE).

> **HISTORY NOTE: THE RETURN TO BAGHDAD**
>
> Al-Ma'mun stayed in Marw for several years before ***returning to Baghdad in 204 AH (819 CE)***. Baghdad was then recovering from the destruction of the civil war.
>
> Al-Ma'mun then made Baghdad ***a centre of learning***: building observatories, sponsoring the measurement of the earth and encouraging translation. After him, Caliph ***al-Mu'tasim*** moved the capital to ***Samarra*** (221 AH / 836 CE), and Caliph ***al-Mutawakkil*** built the new city of ***al-Ja'fariyyah*** near Samarra.

LESSON

The Banu Musa grew up in an age of ***great change***: war, rebuilding and the moving of capitals. Yet they kept learning and creating. Unstable times are ***no excuse*** to stop building knowledge.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

WHO WERE THE BANU MUSA?

Their father, ***Musa ibn Shakir***, was a friend of ***al-Ma'mun*** in Marw, Khurasan, before he became caliph. After Musa died, ***al-Ma'mun became the guardian*** of his three young sons.

HISTORY NOTE: ORPHANS RAISED BY A CALIPH

Historical sources mention that Caliph al-Ma'mun (813–833 CE) ***oversaw their education*** and sent them to the ***House of Wisdom*** in Baghdad. There they studied mathematics, astronomy and mechanics.

As adults they worked for al-Ma'mun and the caliphs after him on ***surveys of the earth*** and ***public works***, including digging ***canals*** for the new city of al-Ja'fariyyah. The eldest, ***Muhammad ibn Musa***, died in ***873 CE***.

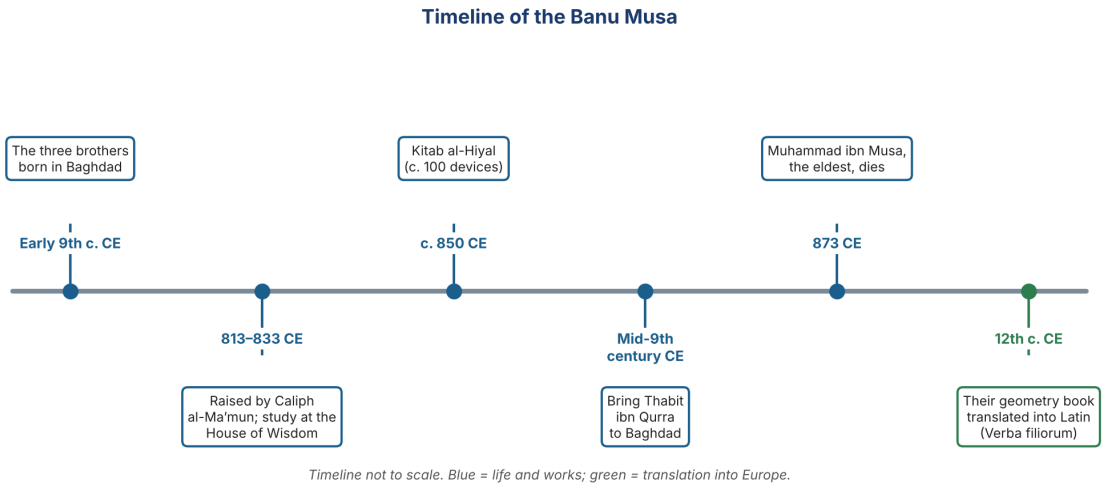


Figure 1: Timeline of the Banu Musa.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

Islam honours those who care for orphans. These three brothers grew up in a caliph's care and later became among the leading scholars of Baghdad. The Messenger of Allah ﷺ said:

HADITH — SAHIH AL-BUKHARI, NO. 5304

حَدَّثَنَا عَمْرُو بْنُ زُرَارَةَ، أَخْبَرَنَا عَبْدُ الْعَزِيزِ بْنُ أَبِي حَازِمٍ، عَنْ أَبِيهِ، عَنْ سَهْلٍ، قَالَ رَسُولُ اللَّهِ صلى الله عليه وسلم «أَنَا وَكَافِلُ الْيَتِيمِ فِي الْجَنَّةِ هَكَذَا». وَأَشَارَ بِالسَّبَّابَةِ وَالْوُسْطَى، وَفَرَّجَ بَيْنَهُمَا شَيْئًا.

TRANSLATION:

Sahl ibn Sa'd رضى الله عنه narrated that the Messenger of Allah ﷺ said: **"I and the one who cares for an orphan will be in Paradise like this"** — and he pointed with his index and middle fingers, keeping a little space between them.

CHAIN OF NARRATION: Narrated by Imam al-Bukhari: from 'Amr ibn Zurarah, from 'Abd al-'Aziz ibn Abi Hazim, from his father Abu Hazim Salamah ibn Dinar, from Sahl ibn Sa'd as-Sa'idi رضى الله عنه.

REFERENCE: Narrated by Imam al-Bukhari in Sahih al-Bukhari, Book of Divorce (Kitab at-Talaq), Hadith No. 5304.

GRADE: SAHIH — contained in Sahih al-Bukhari, the most authentic book of Hadith after the Qur'an by consensus of the Hadith scholars.

Source: https://sunnah.com/bukhari:5304

LESSONS FROM THIS HADITH

Caring for orphans is not only feeding them but also ***educating*** them. Al-Ma'mun gave the Banu Musa ***the best education*** of their time, and the result was three great scholars. Each of us can contribute by ***sponsoring the education of orphans***.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

THE HOUSE OF WISDOM: THE BROTHERS' SCHOOL

The Banu Musa were raised and educated in the world of the ***House of Wisdom***. The institution brought together ***libraries, translators and scholars***, and was managed by figures such as ***Sahl ibn Harun***, al-Ma'mun's librarian.

> **HISTORY NOTE: AN EDUCATION UNDER A CALIPH'S CARE**
>
> Historical sources mention that al-Ma'mun placed the Banu Musa in the care of ***Ishaq ibn Ibrahim al-Mus'abi***, the chief of police in Baghdad, and made sure they studied ***geometry, astronomy, mechanics and music***.
>
> They grew up with the works of ***Euclid, Archimedes, Apollonius, Hero and Ptolemy***, newly translated. This environment made them among ***the first generation*** of scholars educated entirely in the Baghdad tradition of learning.

THREE BROTHERS, THREE SPECIALITIES

BROTHER	MAIN SPECIALITY ACCORDING TO HISTORICAL SOURCES
Muhammad ibn Musa (d. 259 AH / 873 CE)	The eldest; geometry, astronomy, patron of translation; the most influential at court.
Ahmad ibn Musa	Mechanics and devices; regarded as the main author of most devices in Kitab al-Hiyal.
Al-Hasan ibn Musa	Geometry; known for his study of the ellipse and his skill in solving hard geometrical problems.

LESSON

Every child has ***different talents***. A good education helps each person ***discover their strength***, and a united family can combine those strengths for good.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

MUSA IBN SHAKIR: A FATHER'S REPENTANCE

HISTORY NOTE: FROM HIGHWAYMAN TO ASTRONOMER

Ibn al-Qifti and other biographers report that in his youth Musa ibn Shakir was a ***highwayman*** on the roads of Khurasan. He later ***repented***, studied, and became ***an astronomer*** close to al-Ma'mun.

This story is known only from a few later sources and ***cannot be fully verified***. Yet it is often told as an example of how ***a person can change***.

Whether or not the story is accurate, its lesson matches the teaching of Islam: ***the door of repentance is always open***. The Messenger of Allah ﷺ said:

HADITH — SAHIH AL-BUKHARI, NO. 6309

حَدَّثَنَا إِسْحَاقُ، أَخْبَرَنَا حَبَّانُ، حَدَّثَنَا هَمَّامٌ، حَدَّثَنَا قَتَادَةُ، حَدَّثَنَا أَنَسُ بْنُ مَالِكٍ، عَنِ النَّبِيِّ صلى الله عليه وسلم. وَحَدَّثَنَا هُدْبَةُ، حَدَّثَنَا هَمَّامٌ، حَدَّثَنَا قَتَادَةُ، عَنْ أَنَسٍ ـ رضى الله عنه ـ قَالَ قَالَ رَسُولُ اللَّهِ صلى الله عليه وسلم « اللَّهُ أَفْرَحُ بِتَوْبَةِ عَبْدِهِ مِنْ أَحَدِكُمْ سَقَطَ عَلَى بَعِيرِهِ، وَقَدْ أَضَلَّهُ فِي أَرْضٍ فَلاَةٍ ».

TRANSLATION:

Anas ibn Malik رضى الله عنه said: The Messenger of Allah ﷺ said: **"Allah is more pleased with the repentance of His servant than one of you who finds his camel after losing it in the desert."**

CHAIN OF NARRATION: Narrated by Imam al-Bukhari through two chains: from Ishaq ibn Mansur, from Habban ibn Hilal; and from Hudbah ibn Khalid — both from Hammam ibn Yahya, from Qatadah, from Anas ibn Malik رضى الله عنه.

REFERENCE: Narrated by Imam al-Bukhari in Sahih al-Bukhari, Book of Supplications, chapter on repentance, Hadith No. 6309. Also narrated by Muslim (No. 2747).

GRADE: SAHIH — contained in Sahih al-Bukhari, the most authentic book of Hadith after the Qur'an by consensus of the Hadith scholars.

Source: https://sunnah.com/bukhari:6309

LESSONS FROM THIS HADITH

Allah is ***extremely pleased*** with the repentance of His servant. A dark past ***does not close*** a bright future. The children of a man who repented can become great scholars — and each of us can start again with ***repentance and knowledge***.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

KITAB AL-HIYAL: A HUNDRED INGENIOUS DEVICES

Kitab al-Hiyal, written around ***850 CE***, describes ***about 100 devices***: trick vessels, ***automatic control systems***, fountains, self-filling oil lamps, and a ***clamshell grab*** whose design is the same as those used today. They built on the work of Greek engineers such as ***Philo*** and ***Hero***.

Many of these devices use ***conical valves*** and ***floats*** that act by themselves when the water level changes — an early form of ***feedback control***.

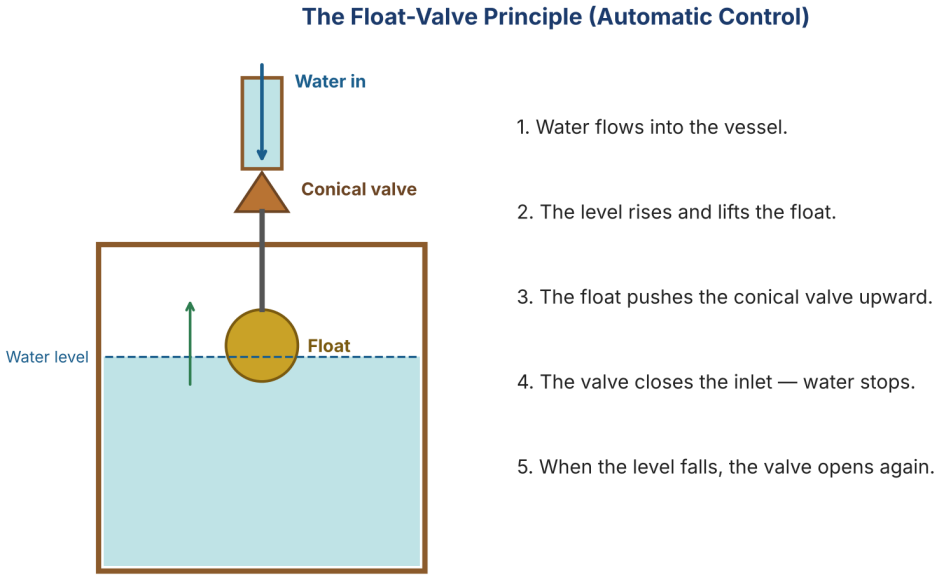


Figure 2: The float-valve principle in Kitab al-Hiyal.

The Banu Musa are also linked to a treatise on an ***instrument that plays music by itself*** (an automatic flute player). Historians of technology regard it as one of the ***earliest known programmable machines***.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

EXAMPLES OF DEVICES IN KITAB AL-HIYAL

The table below summarises some types of device described in Kitab al-Hiyal, based on the modern study and translation by ***Donald R. Hill*** (1979).

TYPE OF DEVICE	DESCRIPTION
Trick vessels	Vessels that pour different liquids, or stop pouring automatically, when filled in a certain way.
Automatic animal drinker	A reservoir that refills itself as animals drink, using a float and a valve.
Fountains	Fountains that change the shape of their jet at intervals, using water pressure.
Self-tending lamp	A lamp that adds oil and raises its wick by itself.
Clamshell grab	A tool for retrieving objects from river beds or wells; its principle is used in modern machinery.
Valves and siphons	Components for controlling the flow of water and air automatically.

WHY "HIYAL"?

The word ***hiyal*** (plural of *hilah*) means "ingenious devices" or "stratagems". In engineering, it means ***creative solutions*** that use the laws of nature — water, air and gravity — to produce movements that seem magical.

LESSON

Some devices were made for ***entertainment***, but the principles discovered — valves, siphons and automatic control — later became the basis of ***very useful technology***. Knowledge that begins with curiosity can bring great benefit.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

THE PRINCIPLE OF AUTOMATIC CONTROL AND MODERN SCIENCE

The devices of the Banu Musa use the principle now called ***feedback control***: a system measures its own state, then corrects itself automatically. Figure 3 shows a simple example.

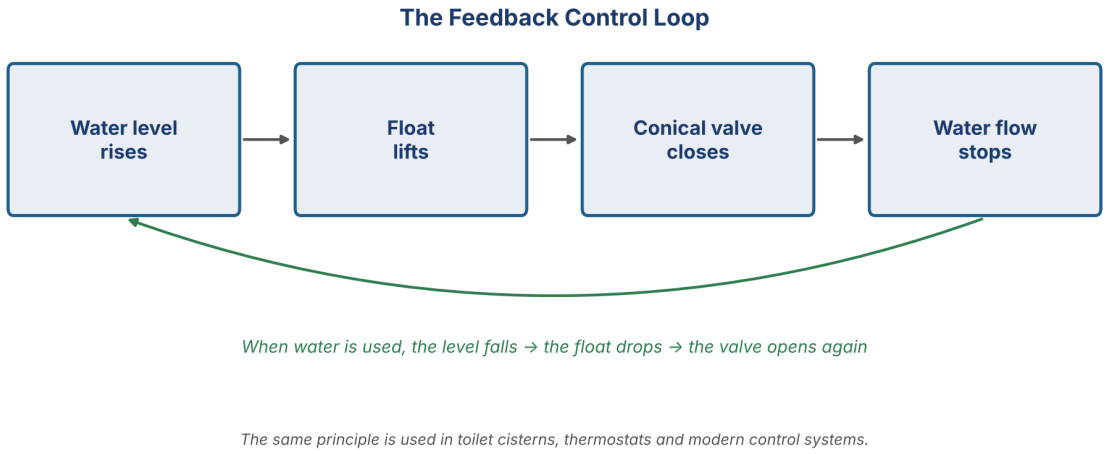


Figure 3: The feedback control loop with a float and a valve.

IN EVERYDAY LIFE TODAY

The same principle is used in ***toilet cisterns***, the ***thermostats*** of refrigerators and air conditioners, car ***cruise control***, and aircraft ***autopilot***. This field is known as ***control engineering*** (Britannica: control system).

LESSON

Allah created the human body with many ***feedback systems*** — regulating body temperature, blood sugar and blood pressure. Engineers merely ***imitate*** a small part of the precision of Allah's creation.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

WATER, AIR AND GRAVITY: THE SCIENCE BEHIND THE DEVICES

The devices in Kitab al-Hiyal depend on ***the laws of nature*** that Allah has set. The Qur'an says that whatever is in the heavens and the earth has been ***subjected*** to humankind:

SURAH AL-JATHIYAH 45:13

وَسَخَّرَ لَكُم مَّا فِي ٱلسَّمَٰوَٰتِ وَمَا فِي ٱلۡأَرۡضِ جَمِيعٗا مِّنۡهُۚ إِنَّ فِي ذَٰلِكَ لَأٓيَٰتٖ لِّقَوۡمٖ يَتَفَكَّرُونَ ١٣

And He has subjected to you whatever is in the heavens and whatever is on the earth - all from Him. Indeed in that are signs for a people who give thought.

Translation: Sahih International — quran.com/45:13

Allah ***"has subjected to you whatever is in the heavens and whatever is on the earth"***. Water, air and gravity are ***subjected creations*** to be used by those who reflect. Tafsir Ibn Kathir 45:13.

SCIENTIFIC PRINCIPLE	USE IN THE BANU MUSA'S DEVICES AND TODAY
Gravity	Water flows from high to low; it turns wheels and fills reservoirs.
Siphon	Moves liquid through a curved tube without a pump ([Britannica: siphon](https://www.britannica.com/technology/siphon)).
Air pressure	Air in a closed vessel blocks or releases the flow of water; the basis of "trick" vessels.
Buoyancy	A float rises when the water level rises; the basis of automatic valves.
Water pressure	Pressurised water produces a jet; the basis of modern hydraulic systems.

EXAMPLES IN DAILY LIFE

We still use these principles every day: a village ***water tower*** uses gravity to send water to homes; an ***aquarium*** is cleaned with a siphon; a car's ***hydraulic brakes*** use liquid pressure; and the ***float*** in a toilet cistern controls the water level. When we understand these principles, we appreciate more ***the precision of the natural laws*** Allah has set.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

THE AUTOMATIC FLUTE PLAYER: A PROGRAMMABLE MACHINE

One of the most fascinating creations of the Banu Musa is ***al-alah allati tuzammir binafsiha*** — "the instrument that plays the flute by itself". It used a ***rotating cylinder with pins***, driven by water, to open and close the holes of a flute.

> **HISTORY NOTE: AMONG THE EARLIEST PROGRAMMABLE MACHINES**
>
> By changing ***the arrangement of the pins*** on the cylinder, the instrument could play ***different tunes***. Historians of technology such as ***Teun Koetsier*** (2001) regard it as one of the ***earliest known programmable machines***.
>
> The principle of the pinned cylinder was later used in ***mechanical clocks***, ***music boxes*** and ***looms***, which eventually led to the idea of the ***computer program***.

WHAT DOES "PROGRAMMABLE" MEAN?

A programmable machine is one whose ***instructions can be changed*** without building a new machine. Our smartphones are a modern example: the same hardware can run ***thousands of different apps*** (Britannica: computer program).

REFLECTION

An idea born in Baghdad more than a thousand years ago is now ***in our pockets***. Beneficial knowledge always ***grows and connects***.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

THREE BROTHERS, ONE BUILDING

The strength of the Banu Musa was ***cooperation***. Muhammad was known in geometry and astronomy, Ahmad in mechanics, and al-Hasan in geometry. They wrote books ***together***. The Messenger of Allah ﷺ described the believers as ***a building***:

HADITH — SAHIH AL-BUKHARI, NO. 481

حَدَّثَنَا خَلاَّدُ بْنُ يَحْيَى، قَالَ حَدَّثَنَا سُفْيَانُ، عَنْ أَبِي بُرْدَةَ بْنِ عَبْدِ اللَّهِ بْنِ أَبِي بُرْدَةَ، عَنْ جَدِّهِ، عَنْ أَبِي مُوسَى، عَنِ النَّبِيِّ صلى الله عليه وسلم قَالَ «إِنَّ الْمُؤْمِنَ لِلْمُؤْمِنِ كَالْبُنْيَانِ، يَشُدُّ بَعْضُهُ بَعْضًا». وَشَبَّكَ أَصَابِعَهُ.

TRANSLATION:

Abu Musa al-Ash'ari رضى الله عنه narrated that the Prophet ﷺ said: **"A believer to another believer is like a building, each part strengthening the other."** And he interlaced his fingers.

CHAIN OF NARRATION: Narrated by Imam al-Bukhari: from Khallad ibn Yahya, from Sufyan ath-Thawri, from Burayd ibn 'Abdullah ibn Abi Burdah, from his grandfather Abu Burdah ibn Abi Musa, from Abu Musa al-Ash'ari رضى الله عنه.

REFERENCE: Narrated by Imam al-Bukhari in Sahih al-Bukhari, Book of Prayer (Kitab as-Salah), Hadith No. 481; also narrated by Muslim (No. 2585).

GRADE: SAHIH — contained in Sahih al-Bukhari, the most authentic book of Hadith after the Qur'an by consensus of the Hadith scholars.

Source: https://sunnah.com/bukhari:481

LESSONS FROM THIS HADITH

A building is strong because each part ***supports the others***. So too are families, teams and the Ummah — strength comes from ***complementing one another***, not from competing.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

COOPERATION IN RIGHTEOUSNESS

SURAH AL-MA'IDAH 5:2

يَٰٓأَيُّهَا ٱلَّذِينَ ءَامَنُواْ لَا تُحِلُّواْ شَعَٰٓئِرَ ٱللَّهِ وَلَا ٱلشَّهۡرَ ٱلۡحَرَامَ وَلَا ٱلۡهَدۡيَ وَلَا ٱلۡقَلَٰٓئِدَ وَلَآ ءَآمِّينَ ٱلۡبَيۡتَ ٱلۡحَرَامَ يَبۡتَغُونَ فَضۡلٗا مِّن رَّبِّهِمۡ وَرِضۡوَٰنٗاۚ وَإِذَا حَلَلۡتُمۡ فَٱصۡطَادُواْۚ وَلَا يَجۡرِمَنَّكُمۡ شَنَـَٔانُ قَوۡمٍ أَن صَدُّوكُمۡ عَنِ ٱلۡمَسۡجِدِ ٱلۡحَرَامِ أَن تَعۡتَدُواْۘ وَتَعَاوَنُواْ عَلَى ٱلۡبِرِّ وَٱلتَّقۡوَىٰۖ وَلَا تَعَاوَنُواْ عَلَى ٱلۡإِثۡمِ وَٱلۡعُدۡوَٰنِۚ وَٱتَّقُواْ ٱللَّهَۖ إِنَّ ٱللَّهَ شَدِيدُ ٱلۡعِقَابِ ٢

O you who have believed, do not violate the rites of Allah or [the sanctity of] the sacred month or [neglect the marking of] the sacrificial animals and garlanding [them] or [violate the safety of] those coming to the Sacred House seeking bounty from their Lord and [His] approval. But when you come out of ihram, then [you may] hunt. And do not let the hatred of a people for having obstructed you from al-Masjid al-Haram lead you to transgress. And cooperate in righteousness and piety, but do not cooperate in sin and aggression. And fear Allah; indeed, Allah is severe in penalty.

Translation: Sahih International — quran.com/5:2

Allah commands: ***"cooperate in righteousness and piety"***. The Banu Musa's cooperation in knowledge is an example of ***ta'awun*** in goodness. Tafsir Ibn Kathir 5:2.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

The Messenger of Allah ﷺ also described the believers as ***one body***:

HADITH — SAHIH AL-BUKHARI, NO. 6011

حَدَّثَنَا أَبُو نُعَيْمٍ، حَدَّثَنَا زَكَرِيَّاءُ، عَنْ عَامِرٍ، قَالَ سَمِعْتُهُ يَقُولُ سَمِعْتُ النُّعْمَانَ بْنَ بَشِيرٍ، يَقُولُ قَالَ رَسُولُ اللَّهِ صلى الله عليه وسلم « تَرَى الْمُؤْمِنِينَ فِي تَرَاحُمِهِمْ وَتَوَادِّهِمْ وَتَعَاطُفِهِمْ كَمَثَلِ الْجَسَدِ إِذَا اشْتَكَى عُضْوًا تَدَاعَى لَهُ سَائِرُ جَسَدِهِ بِالسَّهَرِ وَالْحُمَّى ».

TRANSLATION:

An-Nu'man ibn Bashir رضى الله عنه said: The Messenger of Allah ﷺ said: **"You see the believers, in their mercy, love and sympathy for one another, like a single body: when one limb complains, the rest of the body responds to it with sleeplessness and fever."**

CHAIN OF NARRATION: Narrated by Imam al-Bukhari: from Abu Nu'aim al-Fadl ibn Dukain, from Zakariyya ibn Abi Za'idah, from 'Amir ash-Sha'bi, from an-Nu'man ibn Bashir رضى الله عنه.

REFERENCE: Narrated by Imam al-Bukhari in Sahih al-Bukhari, Book of Good Manners, Hadith No. 6011. Also narrated by Muslim (No. 2586).

GRADE: SAHIH — contained in Sahih al-Bukhari, the most authentic book of Hadith after the Qur'an by consensus of the Hadith scholars.

Source: https://sunnah.com/bukhari:6011

LESSONS FROM THIS HADITH

In a team, the success of one is the success of all, and the hardship of one is felt by all. This is the spirit that makes ***families and organisations*** strong.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

GEOMETRY: MEASURING PLANE AND SPHERICAL FIGURES

The Banu Musa's geometry book, ***Kitab Ma'rifat Misahat al-Ashkal al-Basitah wa al-Kuriyyah*** (The Book of Knowing the Measurement of Plane and Spherical Figures), explains how to calculate ***the area of a circle***, ***the surface area and volume of a sphere***, and a method for ***trisecting an angle*** with a mechanical tool.

TOPIC	BRIEF DESCRIPTION
Area of a circle	Proved to be half the circumference × the radius, following Archimedes.
Sphere	Surface area = $4\pi r^2$; volume = $\frac{4}{3}\ \pi r^3$ (modern notation).
Heron's formula	A way to calculate the area of a triangle from the lengths of its three sides.
Trisecting an angle	A mechanical solution to a classic Greek problem.
The ellipse	A method of drawing an ellipse with a string and two pins (the "gardener's method").

The book was translated into Latin by ***Gerard of Cremona*** and influenced European mathematicians such as ***Leonardo Fibonacci*** (MacTutor: Banu Musa).

LESSON

Geometry is the language of ***building and design***. Mosques, domes and minarets are built with its help.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

GEOMETRY IN ISLAMIC ARCHITECTURE

The geometry developed by the Banu Musa and later scholars was used in ***Islamic architecture***: domes, ***muqarnas*** (layered, honeycomb-like ornament) and the ***geometric patterns*** on mosque walls (Britannica: Islamic arts — architecture). These patterns are built with only ***a compass and a ruler***, based on circles and stars.

Islamic geometric patterns also reflect ***tawhid***: from one point and one circle comes an endless pattern — a reminder of the unity and order of Allah's creation.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

ASTRONOMY AND THE MEASUREMENT OF THE EARTH

The Banu Musa were also astronomers. They had an ***observatory*** at their house in Baghdad, and recorded observations of the sun and stars over many years.

> **HISTORY NOTE: MEASURING THE CIRCUMFERENCE OF THE EARTH**
>
> Historical sources mention that, on al-Ma'mun's orders, the Banu Musa took part in ***measuring the length of one degree of meridian*** on the plain of ***Sinjar***. Two groups walked north and south until the height of the pole star had changed by ***one degree***, and that distance was measured.
>
> The result was about ***56⅔ Arabic miles*** per degree. Muhammad ibn Musa is also linked to calculations of ***the length of the solar year*** and observations of the motion of the stars.

COMPARISON WITH MODERN SCIENCE

Today the earth's circumference at the equator is known to be about ***40,075 km*** (NASA: Earth facts). The estimate of al-Ma'mun's astronomers is considered ***very close*** to the true value, though the exact length of the Arabic mile is still debated by historians.

The method combined ***observation of the sky*** with ***measurement on the ground*** — a spirit that matches the Qur'an's call to observe the heavens and the earth.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

PUBLIC WORKS AND TRUST: THE STORY OF THE AL-JA'FARI CANAL

The Banu Musa also worked as ***civil engineers***. One story recorded by ***Ibn Abi Usaybi'ah*** teaches a lesson about trust and teamwork.

> **HISTORY NOTE: A CANAL THAT NEARLY FAILED**
>
> Caliph ***al-Mutawakkil*** ordered Muhammad and Ahmad ibn Musa to dig ***the al-Ja'fari canal***. They handed the work to ***al-Farghani***, the famous astronomer. But there was ***an error of calculation***: the end of the canal was lower, so the water could not flow properly.
>
> Al-Mutawakkil was furious. It is said that ***Sind ibn 'Ali***, an astronomer whom the Banu Musa had previously envied, ***defended them*** before the caliph. In the end they were saved because the caliph died soon afterwards (247 AH / 861 CE).

This story reminds us that ***the trust of work*** must be guarded, for the Messenger of Allah ﷺ made betraying a trust a sign of hypocrisy:

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

HADITH — SAHIH AL-BUKHARI, NO. 33 (MUTTAFAQ ‘ALAYH)

حَدَّثَنَا سُلَيْمَانُ أَبُو الرَّبِيعِ، قَالَ حَدَّثَنَا إِسْمَاعِيلُ بْنُ جَعْفَرٍ، قَالَ حَدَّثَنَا نَافِعُ بْنُ مَالِكِ بْنِ أَبِي عَامِرٍ أَبُو سُهَيْلٍ، عَنْ أَبِيهِ، عَنْ أَبِي هُرَيْرَةَ، عَنِ النَّبِيِّ صلى الله عليه وسلم قَالَ «آيَةُ الْمُنَافِقِ ثَلاَثٌ إِذَا حَدَّثَ كَذَبَ، وَإِذَا وَعَدَ أَخْلَفَ، وَإِذَا اؤْتُمِنَ خَانَ».

TRANSLATION:

Abu Hurayrah رضى الله عنه reported that the Prophet ﷺ said: **“The signs of a hypocrite are three: when he speaks he lies, when he promises he breaks his promise, and when he is entrusted he betrays the trust.”**

CHAIN OF NARRATION: Narrated by Imam al-Bukhari: from Sulayman Abu ar-Rabi‘, from Isma‘il ibn Ja‘far, from Nafi‘ ibn Malik ibn Abi ‘Amir Abu Suhayl, from his father (Malik ibn Abi ‘Amir), from Abu Hurayrah رضى الله عنه.

REFERENCE: Narrated by Imam al-Bukhari in Sahih al-Bukhari, Book of Faith, Hadith No. 33. Also narrated by Muslim (No. 59).

GRADE: SAHIH — contained in Sahih al-Bukhari, the most authentic book of Hadith after the Qur'an by consensus of the Hadith scholars.

Source: https://sunnah.com/bukhari:33

LESSONS FROM THIS HADITH

Every task is ***a trust***. Engineers, contractors and workers must make sure work is ***checked carefully*** and ***supervised honestly***. The story of Sind ibn ‘Ali also teaches ***the nobility of forgiveness***: he defended those who had once treated him unjustly.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

PATRONS OF KNOWLEDGE AND TRANSLATORS

HISTORY NOTE: WEALTH SPENT ON KNOWLEDGE

Their public works made the Banu Musa ***wealthy and influential***. They used that wealth to ***search for ancient manuscripts***, including sending agents to Byzantium, and to ***sponsor translators***.

On one journey, Muhammad met the mathematician ***Thabit ibn Qurra*** and brought him to Baghdad. ***Hunayn ibn Ishaq*** was also among the translators in their circle.

Their geometry book on ***measuring plane and spherical figures*** was translated into Latin by ***Gerard of Cremona*** in the 12th century CE as *Verba filiorum Moysi filii Sekir* — "The Words of the Sons of Musa ibn Shakir".

REFLECTION

Wealth given by Allah can become ***a path for spreading knowledge***. Sponsoring knowledge is a charity whose benefit endures. The Banu Musa were not only scholars, but also ***builders of other scholars***.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

THABIT IBN QURRA AND HUNAYN IBN ISHAQ

Two great figures closely linked to the Banu Musa were ***Thabit ibn Qurra*** and ***Hunayn ibn Ishaq***.

HISTORY NOTE: FROM MONEY-CHANGER TO COURT MATHEMATICIAN

According to the reports, ***Thabit ibn Qurra*** (d. 288 AH / 901 CE) was a ***money-changer*** in Harran. Muhammad ibn Musa, passing through Harran, was impressed by his intelligence, brought him to Baghdad and ***taught him*** in his own house.

Thabit later became a mathematician and astronomer at the court of Caliph ***al-Mu'tadid***. He translated the works of ***Euclid, Archimedes and Ptolemy***, and discovered a formula for ***amicable numbers***, such as 220 and 284 (MacTutor: Thabit).

HUNAYN IBN ISHAQ: THE ART OF TRANSLATION

Hunayn ibn Ishaq (d. 260 AH / 873 CE) is famous for ***gathering several manuscripts*** of a book before translating it, so that his translation would be accurate. He translated dozens of ***Galen's*** medical works and wrote a book on ***the eye*** that is among the earliest in ophthalmology.

LESSON

The Banu Musa ***recognised talent*** and ***invested*** their wealth in developing it. A money-changer became a great mathematician because someone ***believed in his potential***.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

ENVY AMONG SCHOLARS

History also records a less beautiful side. Ibn Abi Usaybi'ah reports that the Banu Musa once ***quarrelled with al-Kindi***, the philosopher of Baghdad, so that al-Kindi's library was confiscated for a time — before it was eventually returned. This story reminds us of the words of the Messenger of Allah ﷺ:

HADITH — SAHIH AL-BUKHARI, NO. 6065

حَدَّثَنَا أَبُو اليَمَانِ، أَخْبَرَنَا شُعَيْبٌ، عَنِ الزُّهْرِيِّ، قَالَ حَدَّثَنِي أَنَسُ بْنُ مَالِكٍ ـ رضى الله عنه ـ أَنَّ رَسُولَ اللَّهِ صلى الله عليه وسلم قَالَ «لاَ تَبَاغَضُوا، وَلاَ تَحَاسَدُوا، وَلاَ تَدَابَرُوا، وَكُونُوا عِبَادَ اللَّهِ إِخْوَانًا، وَلاَ يَحِلُّ لِمُسْلِمٍ أَنْ يَهْجُرَ أَخَاهُ فَوْقَ ثَلاَثَةِ أَيَّامٍ».

TRANSLATION:

Anas ibn Malik رضى الله عنه narrated that the Messenger of Allah ﷺ said: **"Do not hate one another, do not envy one another, and do not turn your backs on one another. Be, O servants of Allah, brothers.** It is not lawful for a Muslim to shun his brother for more than three days."

CHAIN OF NARRATION: Narrated by Imam al-Bukhari: from Abu al-Yaman al-Hakam ibn Nafi', from Shu'ayb ibn Abi Hamzah, from Ibn Shihab az-Zuhri, from Anas ibn Malik رضى الله عنه.

REFERENCE: Narrated by Imam al-Bukhari in Sahih al-Bukhari, Book of Manners (Kitab al-Adab), Hadith No. 6065; also narrated by Muslim (No. 2559).

GRADE: SAHIH — contained in Sahih al-Bukhari, the most authentic book of Hadith after the Qur'an by consensus of the Hadith scholars.

Source: https://sunnah.com/bukhari:6065

LESSONS FROM THIS HADITH

Great knowledge ***does not guarantee a pure heart***. Scholars too are human and can be tested by envy. We take their ***contributions to knowledge***, and take ***lessons*** from their mistakes.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

INGENUITY FOR GOOD, NOT EVASION

The word ***hiyal*** is also used in fiqh for ***legal stratagems*** — ways of evading the rulings of the Shari'ah with an outward form that looks valid. Islam distinguishes between ***ingenuity that brings benefit*** and ***stratagems that cheat Allah's law***. The Messenger of Allah ﷺ condemned such stratagems:

HADITH — SAHIH AL-BUKHARI, NO. 2236 (MUTTAFAQ 'ALAYH)

حَدَّثَنَا قُتَيْبَةُ، حَدَّثَنَا اللَّيْثُ، عَنْ يَزِيدَ بْنِ أَبِي حَبِيبٍ، عَنْ عَطَاءِ بْنِ أَبِي رَبَاحٍ، عَنْ جَابِرِ بْنِ عَبْدِ اللَّهِ ـ رضى الله عنهما ـ أَنَّهُ سَمِعَ رَسُولَ اللَّهِ صلى الله عليه وسلم يَقُولُ عَامَ الْفَتْحِ، وَهُوَ بِمَكَّةَ «إِنَّ اللَّهَ وَرَسُولَهُ حَرَّمَ بَيْعَ الْخَمْرِ وَالْمَيْتَةِ وَالْخِنْزِيرِ وَالأَصْنَامِ». فَقِيلَ يَا رَسُولَ اللَّهِ، أَرَأَيْتَ شُحُومَ الْمَيْتَةِ فَإِنَّهَا يُطْلَى بِهَا السُّفُنُ، وَيُدْهَنُ بِهَا الْجُلُودُ، وَيَسْتَصْبِحُ بِهَا النَّاسُ. فَقَالَ «لاَ، هُوَ حَرَامٌ». ثُمَّ قَالَ رَسُولُ اللَّهِ صلى الله عليه وسلم عِنْدَ ذَلِكَ «قَاتَلَ اللَّهُ الْيَهُودَ، إِنَّ اللَّهَ لَمَّا حَرَّمَ شُحُومَهَا جَمَلُوهُ ثُمَّ بَاعُوهُ فَأَكَلُوا ثَمَنَهُ».

TRANSLATION:

Jabir ibn 'Abdillah رضى الله عنهما heard the Messenger of Allah ﷺ say, in the year of the Conquest, while he was in Makkah: "Allah and His Messenger have forbidden the sale of wine, carrion, pigs and idols." It was said: "O Messenger of Allah, what about the fat of carrion? It is used to coat ships, to oil hides, and people use it for lamps." He said: "No, it is forbidden." Then the Messenger of Allah ﷺ said: **"May Allah destroy the Jews. When Allah forbade them the fat (of animals), they melted it down, then sold it and consumed its price."**

CHAIN OF NARRATION: Narrated by Imam al-Bukhari: from Qutaybah, from al-Layth, from Yazid ibn Abi Habib, from 'Ata' ibn Abi Rabah, from Jabir ibn 'Abdillah رضى الله عنهما.

REFERENCE: Narrated by Imam al-Bukhari in Sahih al-Bukhari, Book of Sales, Hadith No. 2236. Also narrated by Muslim (No. 1581).

GRADE: SAHIH — contained in Sahih al-Bukhari, the most authentic book of Hadith after the Qur'an by consensus of the Hadith scholars.

Source: https://sunnah.com/bukhari:2236

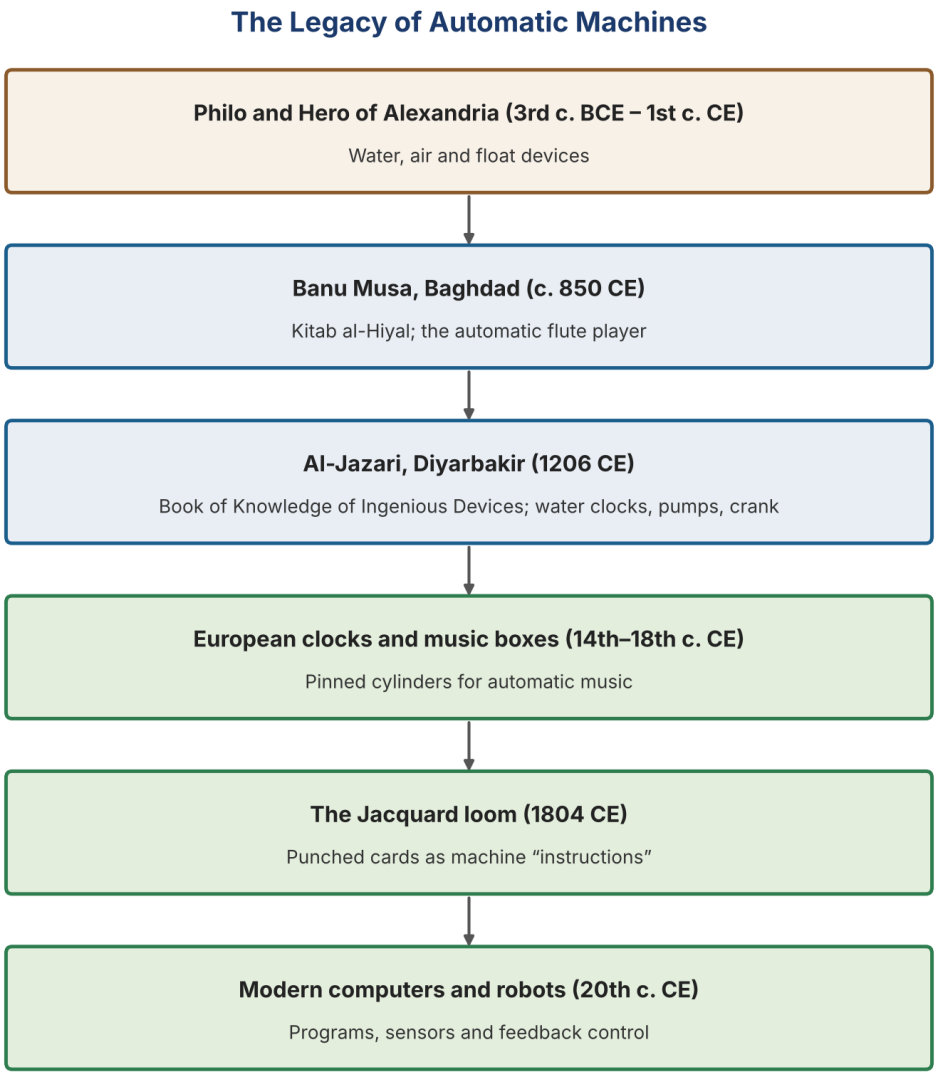
LESSONS FROM THIS HADITH

Changing the form of something forbidden — such as melting fat — ***does not make it lawful***. Ingenuity must be used to ***make good easier***, not to ***evade the law***. The Banu Musa used their "hiyal" to create useful devices — that is praiseworthy ingenuity.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

THE LEGACY OF THE BANU MUSA: FROM AL-JAZARI TO MODERN ROBOTS

The engineering tradition of the Banu Musa was continued by later Muslim engineers. The most famous is ***Badi' az-Zaman al-Jazari*** (d. c. 1206 CE), who wrote ***Kitab fi Ma'rifat al-Hiyal al-Handasiyyah*** (The Book of Knowledge of Ingenious Mechanical Devices), describing ***water clocks, water pumps and crank mechanisms*** (Britannica: al-Jazari).



Simplified diagram. Brown = Greek; blue = Muslim world; green = Europe and the modern era.

Figure 4: The legacy of automatic machines, from Alexandria to modern robots.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

WATER ENGINEERING IN ISLAMIC CIVILISATION

Besides the devices of the Banu Musa, Islamic civilisation was known for many ***water and wind technologies*** that made life easier:

TECHNOLOGY	DESCRIPTION
Noria (water wheel)	A great wheel that lifts river water to high channels; the norias of Hama, Syria, still stand today.
Qanat	Underground tunnels carrying water from hills to villages and fields in Persia and North Africa.
Windmill	Vertical-axis windmills in Sistan (Persia) were used to grind grain and pump water.
Water clock	Used to tell time, including prayer times, before mechanical clocks.

These technologies show that engineering was used for ***agriculture, food and worship*** — the basic needs of the Ummah (Britannica: noria).

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

LESSON: A CONNECTED LEGACY

The Banu Musa took Greek knowledge, ***improved it***, and passed it on to al-Jazari and to Europe. Today, Muslim engineering students who design ***robots, drones and automatic systems*** are continuing the same tradition.

This tradition also reminds us that ***technological progress*** must be accompanied by ***good character***: trust, cooperation and avoiding envy — values we learn from the story of the Banu Musa.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

TECHNOLOGY, TIME AND GRATITUDE

The story of the Banu Musa ends in our time with all kinds of ***automatic technology***: smartphones, cars, robots and artificial intelligence. All of these are ***blessings*** — but also ***tests***. The Messenger of Allah ﷺ said:

HADITH — SAHIH AL-BUKHARI, NO. 6412

حَدَّثَنَا الْمَكِّيُّ بْنُ إِبْرَاهِيمَ، أَخْبَرَنَا عَبْدُ اللَّهِ بْنُ سَعِيدٍ ـ هُوَ ابْنُ أَبِي هِنْدٍ ـ عَنْ أَبِيهِ، عَنِ ابْنِ عَبَّاسٍ ـ رضى الله عنهما ـ قَالَ قَالَ النَّبِيُّ صلى الله عليه وسلم « نِعْمَتَانِ مَغْبُونٌ فِيهِمَا كَثِيرٌ مِنَ النَّاسِ، الصِّحَّةُ وَالْفَرَاغُ ». قَالَ عَبَّاسٌ الْعَنْبَرِيُّ حَدَّثَنَا صَفْوَانُ بْنُ عِيسَى، عَنْ عَبْدِ اللَّهِ بْنِ سَعِيدِ بْنِ أَبِي هِنْدٍ، عَنْ أَبِيهِ، سَمِعْتُ ابْنَ عَبَّاسٍ، عَنِ النَّبِيِّ صلى الله عليه وسلم مِثْلَهُ.

TRANSLATION:

Ibn ‘Abbas رضى الله عنهما said: The Prophet ﷺ said: **“There are two blessings in which many people are deceived: health and free time.”**

CHAIN OF NARRATION: Narrated by Imam al-Bukhari: from al-Makki ibn Ibrahim, from ‘Abdullah ibn Sa‘id ibn Abi Hind, from his father, Sa‘id ibn Abi Hind, from ‘Abdullah ibn ‘Abbas رضى الله عنهما.

REFERENCE: Narrated by Imam al-Bukhari in Sahih al-Bukhari, Book of Heart-Softeners (Kitab al-Riqaq), chapter “There is no life except the life of the Hereafter”, Hadith No. 6412.

GRADE: SAHIH — contained in Sahih al-Bukhari, the most authentic book of Hadith after the Qur'an by consensus of the Hadith scholars.

Source: https://sunnah.com/bukhari:6412

LESSONS FROM THIS HADITH

Many people ***lose out*** on two blessings: health and free time. Technology should ***save our time*** for beneficial things, not waste it. The Banu Musa used their time to ***build knowledge***; we are tested on whether we use technology to ***build*** or to ***waste time***.

GRATITUDE FOR THE BLESSING OF TECHNOLOGY

Remember Allah’s command to the family of David عَلَيْهِ السَّلَامُ after the blessings of engineering were mentioned: ***“Work, O family of David, in gratitude”*** (34:13). Gratitude for technology means using it for ***worship, knowledge, family and service to people***.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

A SHORT GUIDE TO USING TECHNOLOGY

First: set screen time limits, and put prayer, family and sleep first. ***Second:*** use technology to ***learn*** — reading the Qur'an, lectures and online courses. ***Third:*** verify before sharing information. ***Fourth:*** teach children to use technology ***wisely and with good manners***. ***Fifth:*** be a ***creator***, not just a user — like the Banu Musa, who invented devices for the benefit of people.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

ESTABLISHED REPORTS AND POPULAR STORIES

The table below separates what is established from what needs checking about the Banu Musa.

STORIES AND THEIR STATUS

POPULAR STATEMENT	STATUS
The three brothers were raised by Caliph al-Ma'mun after their father died.	Established in historical sources.
Kitab al-Hiyal contains about 100 devices.	Established. The book still exists and has been studied.
Their father, Musa ibn Shakir, was a highwayman in his youth.	Reported by biographers; hard to verify.
The Banu Musa quarrelled with al-Kindi.	Reported by Ibn Abi Usaybi'ah; the details come from one main source.
They invented the world's first robot.	Exaggerated. Automatic devices existed in Greek times; they developed them.
Their automatic flute player was the earliest programmable machine.	The view of some historians of technology; among the earliest known.
The story of the al-Ja'fari canal and Sind ibn 'Ali's defence.	Reported by Ibn Abi Usaybi'ah; the details come from one source.

REFLECTION — HONOUR WITHOUT EXAGGERATION

The Banu Musa ***do not need*** to be called the inventors of the first robot to be honoured. Their real contributions — automatic control devices, geometry and the sponsorship of knowledge — are great enough.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

LESSONS AND CONCLUSION

LESSONS FROM THIS EBOOK

First: Engineering and cooperation are valued in the Qur'an (18:95–96).

Second: Technology is a blessing to be shown gratitude for (34:13).

Third: Caring for orphans can produce great people (Sahih al-Bukhari 5304).

Fourth: The door of repentance is always open (Sahih al-Bukhari 6309).

Fifth: Strength comes from supporting one another (Sahih al-Bukhari 481).

Sixth: Guard the trust of your work and check it carefully (Sahih al-Bukhari 33).

Seventh: Use wealth to sponsor knowledge and to build other scholars.

Eighth: Avoid envy, even among people of knowledge (Sahih al-Bukhari 6065).

Ninth: Use ingenuity for good, not for stratagems to evade the law (Sahih al-Bukhari 2236).

Tenth: Knowledge that begins with curiosity can bring great benefit to humanity.

Eleventh: Cooperate in righteousness, like one body (5:2; Sahih al-Bukhari 6011).

Twelfth: Use technology and free time for beneficial things (Sahih al-Bukhari 6412).

CONCLUSION

The Banu Musa left behind Kitab al-Hiyal and books of geometry that are studied to this day. The next book of **Tracing the Scholars of Islam**, in sha Allah, will tell the story of ***al-Kindi***, the philosopher and scientist of the Arabs. Wallahu a'lam.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

GLOSSARY AND REFLECTION QUESTIONS

GLOSSARY

TERM	MEANING
Hiyal	Ingenious devices; also legal stratagems in the terminology of fiqh.
Feedback control	A system that measures its own state and corrects itself automatically.
Conical valve	A cone-shaped valve that opens and closes a flow according to the position of a float.
Siphon	A tube that moves liquid from a higher place to a lower one over a higher point.
Programmable machine	A machine whose instructions can be changed without building a new machine.
Meridian	An imaginary line from the North Pole to the South Pole of the earth.
House of Wisdom	An institution of learning in Baghdad in the Abbasid era.
Amanah (trust)	A responsibility that must be fulfilled honestly.

REFLECTION QUESTIONS

1. How did the education given by al-Ma'mun change the future of these three orphaned brothers?

2. Give three examples of feedback control in your daily life.

3. What does the story of the al-Ja'fari canal teach about trust and teamwork?

4. Why does Islam condemn "stratagems" to evade the law, yet praise ingenuity that brings benefit?

5. How can we avoid envy in competition for knowledge and careers?

6. What do the Banu Musa's automatic flute player and today's smartphone have in common?

SUGGESTED ACTIVITIES

Activity 1: Make a simple ***siphon*** with two containers of water and a tube. Place one container higher, fill the tube with water, and watch the water flow by itself into the lower container. Discuss the role of gravity and air pressure.

Activity 2: Open the lid of a toilet cistern at home (with a parent's permission) and look at the ***float and valve***. Compare them with Figure 3.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

Activity 3: Draw an eight-pointed star pattern with a compass and ruler, like the patterns on mosque walls.

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

REFERENCES

THE QUR'AN

The Noble Qur'an, Uthmani text and Sahih International translation. https://quran.com

Tafsir Ibn Kathir, surahs 5, 18, 34 and 45. https://tafsir.app/ibn-katheer/34/13

HADITH

Sahih al-Bukhari 33, 481, 2236, 5304, 6011, 6065, 6309, 6412. https://sunnah.com/bukhari

HISTORY AND MODERN RESEARCH

Ibn al-Nadim, al-Fihrist; Ibn al-Qifti, Tarikh al-Hukama'; Ibn Abi Usaybi'ah, 'Uyun al-Anba' fi Tabaqat al-Atibba'; Banu Musa, Kitab al-Hiyal.

Donald R. Hill, The Book of Ingenious Devices (Kitāb al-Ḥiyal) by the Banū (sons of) Mūsà bin Shākir (1979); Teun Koetsier, "On the prehistory of programmable machines" (2001).

Biographical Encyclopedia of Astronomers, "Banū Mūsā". https://islamsci.mcgill.ca/RASI/BEA/Banu_Musa_BEA.pdf

MacTutor History of Mathematics, "Banu Musa". https://mathshistory.st-andrews.ac.uk/Biographies/Banu_Musa/

Encyclopaedia Britannica, "control system", "computer program", "siphon", "Islamic arts" and "al-Jazari"; NASA, "Earth Facts". https://science.nasa.gov/earth/facts/

Muslim Heritage, "Mechanics of Banu Musa". https://www.muslimheritage.com/article/mechanics-of-banu-musa

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims

SUPPORT & DONATIONS

This eBook is published **entirely free** for Muslims and is **never to be sold**. Donations are most welcome to help with the costs of research, hosting the website quranscience.my and publishing further eBooks — but they are **not obligatory**. May Allah accept every donation as an ongoing charity (sadaqah jariyah).

SURAH AL-BAQARAH 2:261

مَّثَلُ ٱلَّذِينَ يُنفِقُونَ أَمۡوَٰلَهُمۡ فِي سَبِيلِ ٱللَّهِ كَمَثَلِ حَبَّةٍ أَنۢبَتَتۡ سَبۡعَ سَنَابِلَ فِي كُلِّ سُنۢبُلَةٖ مِّاْئَةُ حَبَّةٖۗ وَٱللَّهُ يُضَٰعِفُ لِمَن يَشَآءُۚ وَٱللَّهُ وَٰسِعٌ عَلِيمٌ ٢٦١

The example of those who spend their wealth in the way of Allah is like a seed [of grain] which grows seven spikes; in each spike is a hundred grains. And Allah multiplies [His reward] for whom He wills. And Allah is all-Encompassing and Knowing.

Translation: Sahih International — quran.com/2:261

SURAH SABA' 34:39

قُلۡ إِنَّ رَبِّي يَبۡسُطُ ٱلرِّزۡقَ لِمَن يَشَآءُ مِنۡ عِبَادِهِۦ وَيَقۡدِرُ لَهُۥۚ وَمَآ أَنفَقۡتُم مِّن شَيۡءٖ فَهُوَ يُخۡلِفُهُۥۖ وَهُوَ خَيۡرُ ٱلرَّٰزِقِينَ ٣٩

Say, "Indeed, my Lord extends provision for whom He wills of His servants and restricts [it] for him. But whatever thing you spend [in His cause] - He will compensate it; and He is the best of providers."

Translation: Sahih International — quran.com/34:39

HADITH — SAHIH MUSLIM, NO. 2588

حَدَّثَنَا يَحْيَى بْنُ أَيُّوبَ، وَقُتَيْبَةُ، وَابْنُ، حُجْرٍ قَالُوا حَدَّثَنَا إِسْمَاعِيلُ، - وَهُوَ ابْنُ جَعْفَرٍ - عَنِ الْعَلاَءِ، عَنْ أَبِيهِ، عَنْ أَبِي هُرَيْرَةَ، عَنْ رَسُولِ اللَّهِ صلى الله عليه وسلم قَالَ « مَا نَقَصَتْ صَدَقَةٌ مِنْ مَالٍ وَمَا زَادَ اللَّهُ عَبْدًا بِعَفْوٍ إِلاَّ عِزًّا وَمَا تَوَاضَعَ أَحَدٌ لِلَّهِ إِلاَّ رَفَعَهُ اللَّهُ ».

TRANSLATION:

Abu Hurayrah رضى الله عنه narrated that the Messenger of Allah ﷺ said: "Charity does not decrease wealth.

Allah does not increase a servant who forgives except in honour. And no one humbles himself for the sake of Allah except that Allah raises him in rank."

CHAIN OF NARRATION: Narrated by Imam Muslim: from Yahya bin Ayyub, Qutaibah bin Sa'id and 'Ali bin Hujr, from Isma'il bin Ja'far, from al-'Ala' bin 'Abd al-Rahman, from his father 'Abd al-Rahman bin Ya'qub, from Abu Hurayrah رضي الله عنه .

REFERENCE: Narrated by Imam Muslim in Sahih Muslim, Book of Virtue, Good Manners and Joining the Ties of Kinship (Kitab al-Birr wa al-Silah wa al-Adab), chapter on the encouragement of forgiveness and humility, Hadith No. 2588.

GRADE: SAHIH — contained in Sahih Muslim.

Source: https://sunnah.com/muslim:2588

HADITH — SAHIH MUSLIM, NO. 1631

حَدَّثَنَا يَحْيَى بْنُ أَيُّوبَ، وَقُتَيْبَةُ - يَعْنِي ابْنَ سَعِيدٍ - وَابْنُ حُجْرٍ قَالُوا حَدَّثَنَا إِسْمَاعِيلُ، - هُوَ ابْنُ جَعْفَرٍ - عَنِ الْعَلاَءِ، عَنْ أَبِيهِ، عَنْ أَبِي هُرَيْرَةَ، أَنَّ رَسُولَ اللَّهِ صلى الله عليه وسلم قَالَ « إِذَا مَاتَ الإِنْسَانُ انْقَطَعَ عَنْهُ عَمَلُهُ إِلاَّ مِنْ ثَلاَثَةٍ إِلاَّ مِنْ صَدَقَةٍ جَارِيَةٍ أَوْ عِلْمٍ يُنْتَفَعُ بِهِ أَوْ وَلَدٍ صَالِحٍ يَدْعُو لَهُ ».

TRANSLATION:

Abu Hurayrah رضي الله عنه narrated that the Messenger of Allah ﷺ said: "When a person dies, his deeds come to an end except for three: an ongoing charity, knowledge that is benefited from, or a righteous child who prays for him."

CHAIN OF NARRATION: Narrated by Imam Muslim: from Yahya bin Ayyub, Qutaibah bin Sa'id and 'Ali bin Hujr, from Isma'il bin Ja'far, from al-'Ala' bin 'Abd al-Rahman, from his father 'Abd al-Rahman bin Ya'qub, from Abu Hurayrah رضي الله عنه .

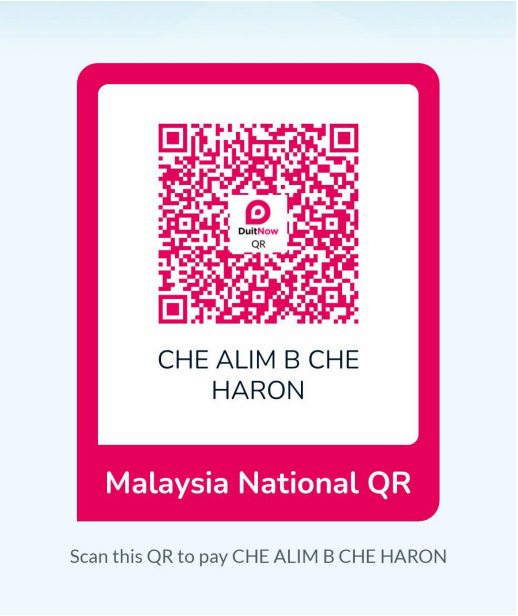
REFERENCE: Narrated by Imam Muslim in Sahih Muslim, Book of Wills (Kitab al-Wasiyyah), chapter on the reward that reaches a person after his death, Hadith No. 1631.

GRADE: SAHIH — contained in Sahih Muslim.

Source: https://sunnah.com/muslim:1631

JAZAKUMULLAHU KHAIRAN KATHIRA

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims



Scan the QR code above (DuitNow, Malaysia) to donate.

DONATE

International donors: click the DONATE button or visit paypal.me/quranscience

© 2026 CE / 1448 AH All Rights Reserved Hj Che Alim Hj Che Haron — Free for Muslims