

Zoologie Médicale'den 'İlm-i Hayvānāt-ı Tıbbī'ye

**Osmanlı Bilim Literatüründe
Tıbbî Zoolojinin
Karşılaştırmalı Tarihi**

From Zoologie Médicale to 'İlm-i Hayvānāt-ı Tıbbī

**A Comparative History of
Medical Zoology in Ottoman
Scientific Literature**

Ahmet Göksu*
Yasemin Biçer**

* Dr. Öğr. Üyesi, İstanbul Medeniyet Üniversitesi, Bilim Tarihi Enstitüsü, Canlı Bilimleri Tarihi Anabilim Dalı
ahmet.goksu@medeniyet.edu.tr

** Yüksek Lisans Öğrencisi, Fatih Sultan Mehmet Vakıf Üniversitesi, Bilim Tarihi Anabilim Dalı, Bilim Tarihi Tezli Yüksek Lisans Programı
yasemin.bicer@stu.fsm.edu.tr

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Orcid: Ahmet Göksu: <https://orcid.org/0000-0002-5582-4985>

Yasemin Biçer: <https://orcid.org/0009-0001-0997-9935>

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Zoologie Médicale'den 'İlm-i Hayvānāt-ı Tıbbī'ye Osmanlı Bilim Literatüründe Tıbbî Zoolojinin Karşılaştırmalı Tarihi

Öz: Bu makale, Osmanlı ilmî ve eğitim ortamında '*ilm-i hayvānāt-ı tıbbī*' (tıbbî zooloji) disiplininin oluşumunu ve gelişimini ele almaktadır. Özellikle 19. yüzyılın ortalarından 20. yüzyılın başlarına kadar olan dönemde tıp, baytarlık ve eczacılık gibi uygulamalı bilim dallarının müfredatında okutulan ders kitapları incelenerek, daha önce Osmanlı eğitim sisteminde yer almayan zooloji ('*ilm-i hayvānāt*') dersinin kurumsallaşma süreci ortaya konmaktadır. Bu bağlamda genel zooloji kitapları ile tıbbî zooloji kitapları arasındaki temel farklar Macarlı Abdullah Bey (ö. 1874), Hüseyin Remzi (ö. 1896), Hulûsi b. Râşid (ö. 1936) ve İsmâil Hakkı Bey'in (ö. 1939) kaleme aldığı '*ilm-i hayvānāt-ı tıbbī*' ile ilgili eserler bağlamında değerlendirilmektedir. Makalede, söz konusu eserlerin konu dizilişi, sınıflandırma anlayışı ve pratik tıbbî meselelere (örneğin parazitoloji) yaklaşımı karşılaştırmalı olarak analiz edilmiştir. Bu inceleme, Osmanlı müelliflerinin özellikle Fransız *Zoologie Médicale* başta olmak üzere Avrupa'daki bilimsel gelişmeleri nasıl yakından takip ettiklerini ve bu bilgileri yerel pedagojik ihtiyaçlara uyarlayarak nasıl yeniden ürettiklerini göstermektedir. Bu eserler yalnızca çeviri değil, aynı zamanda özgün katkılar içeren ve kurumsal eğitimin bir parçası olan metinlerdir.

Anahtar Kelimeler: '*İlm-i Hayvānāt-ı Tıbbī*', Osmanlı Bilim Tarihi, tıbbî zooloji, parazitoloji, zooloji.

From Zoologie Médicale to 'İlm-i Hayvânât-ı Tıbbî: A Comparative History of Medical Zoology in Ottoman Scientific Literature

Abstract: This article examines the formation and development of the discipline of 'İlm-i Hayvânât-ı Tıbbî (medical zoology) within the scientific and educational context of the Ottoman Empire. By analyzing textbooks used in applied sciences such as medicine, veterinary science, and pharmacy from the mid-19th century to the early 20th century, the study reveals the process of institutionalizing of zoology ('ilm-i hayvânât) as a newly introduced subject in Ottoman curricula. It particularly focuses on the works of Macarlı Abdullah Bey (d. 1874), Hüseyin Remzi (d. 1896), Hulûsi ibn Râşid (d. 1936), and İsmâil Hakkı Bey (d. 1939) to identify the main distinctions between general zoology books and medical zoology texts. The article offers a comparative analysis of these works in terms of content structure, classification methods, and their treatment of practical medical issues, such as parasitology. This study demonstrates how the Ottoman authors closely followed European scientific developments, especially the French *Zoologie Médicale* tradition, and adapted this knowledge to meet local pedagogical needs. These texts are not merely translations, but original scholarly contributions that reflect the integration of scientific knowledge into formal institutional education.

Keywords: 'İlm-i Hayvânât-ı Tıbbî, History of Science in the Ottoman Empire, Medical Zoology, Parasitology, Zoology.

The medical historian Dr Rızā Tahsin (d. 1950), who witnessed both the final period of the Ottoman Empire and the early years of the Republic of Türkiye, carefully recorded the evolution of modern medical education in his work *Mir'āt-ı Mekteb-i Tıbbiyye* (The Mirror of the Imperial School of Medicine). In this volume, he recounts the courses taught in medical education from the establishment of the *Tıbhāne-i 'Āmire* (Imperial Medical Training House) up to 1909, when the institution became a branch of the *Dārü'l-Fünûn* (Imperial University). Alongside the curriculum, he provides the names of instructors and their assistants. Upon examining this work, it becomes evident that *'ilm-i ḥayvānāt* (zoology) was included in the theoretical curriculum from the very beginning of the *Mekteb-i Tıbbiyye* (School of Medicine). However, there is no definitive information regarding the textbooks used to teach this subject during the initial forty-six years (1827–1873).¹

In April 1829, several books were ordered from Paris for use in medical education. Hekimbaşı Mustafa Behçet Efendi (d. 1834), who oversaw this process, entrusted them to Abdülhalīm Efendi, the *ḥāfız-ı kütüb* (keeper of books, librarian) of the *Tıbhāne-i 'Āmire*, with instructions that they be registered in the accounting records. However, among these books, there appears to have been no volume suitable for use in *'ilm-i ḥayvānāt* courses. Ilias Tantalidis (d. 1876), in his biographical account of İstefanāki Karatodori Bey (d. 1867), the first instructor of *'ilm-i ḥayvānāt* at the *Tıbhāne-i 'Āmire*, reports that Karatodori authored a work on *tārīh-i ṭabī'ī* (natural history). Although it is not possible to ascertain which courses or academic years this book may have been used, it was likely employed in the teaching of *'ilm-i ḥayvānāt*.

Since there is no explicit indication on the cover or in the preface of *Tārīh-i Ṭabī'ī* (1865), the translation by Hekimbaşı Mustafa Behçet Efendi of Buffon's (d. 1788) *Histoire naturelle*, nor in *'Ilm-i Ḥayvānāt ve Nebātāt* (1859), the translation by Hekimbaşı Salih Efendi (d. 1895) of Carl Arendts' (d. 1881) *Éléments d'histoire naturelle* (1859), it is not possible to determine with certainty whether these works were used in the teaching of *'ilm-i ḥayvānāt*. Therefore, although the title of the *'ilm-i ḥayvānāt* course appears is clearly attested in records from the period between 1827 and 1873, there is no available information regarding the specific texts used to teach this subject at the level of higher education.

¹ The reason for such a periodization is that the earliest extant example of a textbook on *'ilm-i ḥayvānāt* (zoology) used in Ottoman higher education is *'Ilm-i Ḥayvānāt: Mebādi'-i Tārīh-i Ṭabī'īye-i Tıbbiyye* (The Principles of Medical Natural History), a translation of Achille Ricard's work by Hüseyin Remzi, dated AH 1290 / AD 1873.

Post-1873 'İlm-i Hayvânât Literature

The literature produced after 1873 includes numerous works bearing the term *'ilm-i hayvânât* in their titles. The following is a compiled list of these works, featuring their titles, authors or translators, and the educational institutions for which they were composed.²

Author / Translator	Title	Institution
Hekimbaşı Salih Efendi	<i>'İlm-i Hayvânât ve Nebâtât</i> (Science of Animals and Plants) (1865) (1872 reprint: <i>Uşûl-i Menâkıb-ı Tabî'iyât</i> (Principles of Natural Characteristics))	<i>Rüşdiyye Mektebi</i> (Secondary School)
Hüseyin Remzi	<i>'İlm-i Hayvânât: Mebâdî'-i Târîh-i Tabî'yye-i Tıbbiyye</i> (Zoology: Principles of the Medical Natural History) (1873), trans. of Achille Richard ³	<i>Mekteb-i Tıbbiyye-i Şâhâne</i> (Imperial School of Medicine) – for <i>Müfredât-ı Tıbb</i> (Medical Curriculum)
Rıfat İsmail	<i>'İlm-i Hayvânât</i> (1876), trans. from Louis Figuier and Milne-Edwards	<i>Mekteb-i Tıbbiyye-i Mülkiyye</i> (Civil School of Medicine), Pharmacy Section
Hüseyin Remzi	<i>'İlm-i Mevâlid-i Şelâseden</i> <i>'İlm-i Hayvânât</i> (Zoology as a Branch of the Science of the Three Genera) (1876)	<i>Dârü's-Şafâka</i> <i>'İdâdisi</i> , Year 4
Miralay Macarlı Abdullah	<i>Fenn-i Hayvânât-ı Tıbbiyye</i> (Medical Zoology) (1876)	<i>Mekteb-i Tıbbiyye-i Şâhâne</i> (Imperial School of Medicine)
Hüseyin Remzi	<i>Uşûl-i 'İlm-i Hayvânât</i> (Principles of Zoology)(1876)	<i>Dârü's-Şafâka</i> <i>'İdâdisi</i> , Year 5

² The titles and authors of the listed books were identified primarily based on E. K. Unat's *Osmanlı İmparatorluğunda Tıp Zoolojisi ve Parazitoloji*, in combination with a targeted keyword search through the digital archives of the ISAM Library and the İstanbul Metropolitan Municipality Atatürk Library. Information regarding the educational institutions for which these works were prepared has been determined based on statements found either on the covers of the books or in the authors' own prefaces. The list exclusively includes books that feature the terms *'ilm-i hayvânât* or *'ilm-i hayvânât-ı tıbbî* in their titles. Zoological texts published under different titles have not been included here, as they fall within the scope of a separate study.

³ Achille Richard, *Éléments d'histoire naturelle médicale contenant des notions générales sur l'histoire naturelle, la description de tous les aliments, médicaments ou poisons tirés des végétaux et des animaux* (Paris: Baillière, 1849). [Elements of medical natural history, containing general concepts on natural history and the description of all foods, medicines, or poisons derived from plants and animals.]

Mahmud Esad ibn Emin Seydişehrî	<i>Tārīh-i Tabî'î de 'İlm-i Hayvânât</i> (Zoology in Natural History) (1892), trans. of Edmond Langlebert	'İdādî (Preparatory High School)
Hüseyin Remzi	<i>'İlm-i Hayvânât</i> (1893), trans. of Henri Bocquillon (d. 1884)	<i>Dâru'l-Fünûn-ı Tıbbiyye</i> (Medical Faculty of the Imperial University)
Hüseyin Remzi	<i>'İlm-i Hayvânât-ı Tıbbiyye</i> (Medical Zoology, 1893) Vol. 1: General Zoology, Vol. 2: Invertebrates and Parasites, Vol. 3: Vertebrates and Tissue-related Animals ⁴	<i>Mekteb-i Tıbbiyye</i> (School of Medicine)
Necip Āsım	<i>Ķıra'at-ı Fenniyye</i> (Scientific Reading), Part Three: <i>'İlm-i Hayvânât</i> (1895)	<i>Rüşdiyye Mektebi</i> (Secondary School)
Tevfik Şükrü	<i>'İlm-i Hayvânât</i> (1901)	<i>Mekteb-i Tıbbiyye-i Şāhāne 'İdādīsī</i> (Imperial Medical Preparatory School)
Hulûsi ibn Rāşid	<i>'İlm-i Hayvânât-ı Tıbbiyye</i> (1902)	<i>Mekteb-i Tıbbiyye-i 'Askeriyye-i Şāhāne</i> (Imperial Military Medical School)
Mustafa Satı	<i>Tārīh-i Tabî'î 'İlm-i Hayvânât ve Vujūd ve Hayāt-i Beşer Taşvîr ve Taşnîf-i Hayvânât</i> (Natural History, Zoology and the Description and Classification of Human Life and Existence, 1903)	<i>İdādî</i> (Preparatory High School)
İsmâil Hakkı	<i>'İlm-i Hayvânât-ı Tıbbiyye ve Zirā'îyye</i> (Medical and Agricultural Zoology, 1910)	<i>Dâru'l-Fünûn-ı 'Osmānî Tıbb Fakültesi, Baytâr Mektebi</i> (Faculty of Medicine and Veterinary School)
Hulûsi ibn Rāşid	<i>'İlm-i Hayvânât-ı 'Umûmî</i> (General Zoology, 1910)	<i>Dâru'l-Fünûn-ı 'Osmānî 'Ulûm-ı Tabî'îyye Şu'besi</i> (1st & 2nd Year), <i>Eczâcî Mektebi</i> (2nd Year)

⁴ Ekrem Kadri Unat, *Osmanlı İmparatorluğunda Tıp Zoolojisi ve Parazitoloji* (İstanbul: İstanbul University Cerrahpaşa Faculty of Medicine Publications, 1970), 27.

Ebu'l-Muhsin K. Geyangil	<i>Tārīh-i Ṭabī'den Birinci Kısım</i> 'İlm-i Ḥayvānāt (Zoology as the First Part of Natural History, 1912)	All Mekteb-i 'İdādiyye-i Mülkiyye (Civil Preparatory Schools)
Subhi Edhem	'İlm-i Ḥayvānāt-ı 'Umūmiyye Medhal (Introduction to General Zoology, 1917)	'Askerī Baytār Mektebi (Military Veterinary School)
Hüseyin Remzi	<i>Fizyoloji ve 'İlm-i Ḥayvānāt</i> (Physiology and Zoology)	Līse (High School) ⁵

Upon examining the list, it becomes evident that the '*ilm-i ḥayvānāt* literature was gradually expanded to include works bearing the additional designation *ṭıbbī* (medical). In general, those works titled simply with '*ilm-i ḥayvānāt* appear to have been composed for institutions of secondary education, such as *rüşdiyye* (secondary school) and '*idādī* (preparatory school or high school) schools. In contrast, those bearing the title '*ilm-i ḥayvānāt-ı ṭıbbī* were prepared for higher education institutions specializing in medicine, pharmacy, and veterinary science.

During the period in which Hüseyin Remzi (d. 1896) served as the instructor of *Müfredāt-ı Tıbb* (medical curriculum), the *Cem'iyet-i Tıbbiyye-i 'Osmāniyye* (Ottoman Medical Society) commissioned him to translate Achille Richard's (d. 1852) *Éléments d'histoire naturelle médicale contenant des notions générales sur l'histoire naturelle, la description de tous les aliments, médicaments ou poisons tirés des végétaux et des animaux* (1849; Elements of medical natural history comprising general concepts on natural history and the classification of all foods, medicines, or poisons derived from plants and animals) for use at the *Mekteb-i Tıbbiyye-i Şāhāne*. Remzi translated the work into Turkish under the title '*İlm-i Ḥayvānāt: Mabādi'-i Tārīh-i Ṭabī'iyye-i Tıbbiyye* (1873).⁶ Although the term *ṭıbbiyye* appears in its title, the book was composed within a context distinct from the later '*İlm-i Ḥayvānāt-ı Tıbbī* works, as we shall see. It follows the format typical of *histoire naturelle* (natural history) texts, presenting ani-

⁵ On the cover of Hüseyin Remzi's (d. 1896) book found in the ISAM Library catalog, the title appears as *Fizyoloji ve 'İlm-i Ḥayvānāt*, (İstanbul: Amedi Matbaası, 1340). However, in the digital copy preserved at the Atatürk Library of the İstanbul Metropolitan Municipality, the inner title page of the work bears the name *Yeni 'İlm-i Ḥayvānāt*, and includes the note *Matbaa-i Âmire 1340*, indicating that the edition is the eleventh printing (including pre-secondary education editions). The first edition of the book could not be located.

⁶ Hüseyin Remzi, '*İlm-i Ḥayvānāt* (İstanbul: Mekteb-i Tıbbiyye-i Şāhāne Matbaası, 1290/1873–74).

mals according to a structured taxonomy, along with anatomical and morphological data, and includes information on their medical and pharmacological uses. In this regard, the book corresponds to the *Müfredât-ı Tıbb* course (a practical course focused on medicinal applications), and we learn from Macarlı Abdullah Bey's (d. 1874) *Fenn-i Hayvânât-ı Tıbbiyye*, dated 1876, that it was also utilized in *'ilm-i hayvânât* courses:

It should be known (*ma'lûm ola ki*) that the appearance of intestinal worms (*dîdân-ı am'ân*) residing in the human bowels was, in the past, attributed and ascribed (*'a'fve isnâd*) to their spontaneous generation (*vehleten tevellüd*) in those parts. Up to the present moment, even in Richard's *Târîh-i Tabî'iyye*, which continues to be taught at the *Dârü'l-fünûn-ı Tıbbiyye-i Şâhâne*, the idea above (*fıkr-i ma'dbûr*) persists. However, based on the fruitful results (*âsâr-ı müsmire*) of the new experiments (*tecârib-i cedîde*) and recent investigations (*taḥkîkât-ı 'adîde*) conducted in our present time, it has now been conclusively established (*vâsıl-ı mertebe-i subûṭ*) that this notion (*zehâb-ı mezkûr*)—originating from the opinion of the ancients (*kudemâ'in zehâbı*)—is a wholly irrational error, entirely devoid of reason (*hilye-i 'aḳldan 'arî haṭâyât-ı maḥza*).⁷

At this juncture, it is necessary to consider the meaning of the term *hayvânât-ı tıbbî*. *Hayvânât-ı tıbbî*, or 'medical zoology' in modern Turkish, refers to a sub-discipline of zoological science concerned with animal groups selected based on their close association with human beings. The principal subjects of this discipline include parasitic protozoa⁸ and helminths, as well as insects that act as vectors, carrying bacteria and viruses from infected to uninfected hosts. Since most of these organisms are parasitic, *medical zoology* and *parasitology* have often been used interchangeably.⁹ Gaining prominence in the nineteenth century, particularly through research aligned with the priorities of tropical medicine¹⁰, medical zoology has since evolved into several distinct specialized fields, including bacteriology, virology, and parasitology.

⁷ Miralay Macarlı Abdullah Bey, *Fenn-i Hayvânât-ı Tıbbiyye*, trans. Miralay Ali Raşid Bey (İstanbul: Mekteb-i Tıbbiyye-i Şâhâne Matbaası, 1293/1876), 75.

⁸ Protozoa are single-celled eukaryotic organisms, many of which are known to cause diseases in humans and animals.

⁹ R. W. Hegner, "Medical Zoology and Human Welfare", *Science* 60 (1924), 551–558.

¹⁰ Tropical medicine encompasses the diagnosis and treatment of diseases prevalent in tropical and subtropical climates. It gained prominence in the nineteenth century, particularly when physicians responsible for the care of colonial administrators and military personnel encountered infectious diseases previously unknown in the temperate climates of Europe.

Medical Zoology Texts ('İlm-i Hayvânât-ı Tıbbî): Authorship, Translation, and Compilation

Upon examining the list of books presented in the previous section, it becomes evident that until the publication of *Fenn-i Hayvânât-ı Tıbbiyye* in 1876, authored by Macarlı Abdullah Bey (d. 1874)—the texts used in higher education for courses on *hayvânât* had been prepared within the framework of *ţārîh-i tabî'î* (natural history) and bore titles reflecting this tradition. In this context, one is prompted to ask why Macarlı Abdullah Bey, as a pioneering figure, departed from the *ţārîh-i tabî'î* convention and instead titled his work *Fenn-i Hayvânât-ı Tıbbiyye*. To answer this question, it is necessary to review the biography of Macarlı Abdullah Bey and the preface *muqaddime* of his work.

Born in Vienna in 1800, Abdullah Bey was known in Europe for forty-eight years as Karl Eduard Hammerschmidt, until he left Austria following the Vienna Uprising of 1848. Although he began his professional career in law, his deep interest in the natural sciences and medicine eventually led him to pursue formal education in these areas. Hammerschmidt became well-known in Europe for his work in entomology. Between 1830 and 1832, he successfully demonstrated the metamorphosis of more than one thousand insects from various classes of the animal kingdom. This remarkable endeavor earned him admission to the Imperial Leopoldina–Carolina Academy in Breslau.¹¹

During the years when Hammerschmidt was actively engaged in scientific pursuits, the first exemplar of medical zoology literature—*Medizinische Zoologie*, co-authored by J. F. Brandt and J. T. Ratzeburg—had entered circulation within European scientific circles, in a region not far from his own. Given that all three individuals were recognized during the same period as specialists in paleontology and entomology, it is hardly conceivable that Hammerschmidt—later known as Macarlı Abdullah Bey—would have remained unaware of this work. His student, Hüseyin Remzi Bey, also includes a noteworthy biographical footnote about his mentor in the second volume of his three-volume work, *'İlm-i Hayvânât-ı Tıbbiyye* (1893). According to Remzi, *Fenn-i Hayvânât-ı Tıbbiyye* was originally authored in German and later translated into French by Abdullah Bey himself, in his own handwriting, around 1873, when he was appointed as an instructor of *ţārîh-i tabî'î* (natural history) at the *Mekteb-i Tıbbiyye-i Şāhāne*.¹²

¹¹ Ekrem Kadri Unat, "Macarlı Miralay Dr. Abdullah Bey'in Hayatı ve Türk Tıp Zoolojisindeki Yeri", *Türk Mikrobiyolojisi Cemiyeti Dergisi* 5 (1975), 7–18.

¹² Hüseyin Remzi, *'İlm-i Hayvânât-ı Tıbbiyye*. (İstanbul: Mahmud Bey Matbaası, 1311/1893).

Remzi's account is particularly revealing, as it reflects Abdullah Bey's close engagement with the scientific literature in German. At first glance, these details suggest a plausible intellectual link between Macarlı Abdullah and Brandt & Ratzeburg. However, upon closer examination, it becomes clear that their works differ substantially in content. Unlike Brandt and Ratzeburg, Abdullah Bey adopted a more systematic structure, progressing from unicellular organisms to more complex ones, and offered little or no discussion on the therapeutic use of animals.¹³

*Fenn-i Hayvânât-ı Tıbbiyye*¹⁴, the first originally authored *'ilm-i hayvânât-ı tıbbî* (medical zoology) book in the Ottoman Empire, was composed without illustrations and spans a total of 509 pages. Following a three-page table of contents, the work opens with the *dibāce-i mütercim* (translator's preface), which bears the signature of Ali Râşid Bey, who had been commissioned by the *Cem'iyet-i Tıbbiyye-i 'Osmâniyye* (Ottoman Medical Society) to translate the work into Turkish. The subsequent fourteen-page *muqaddime* (introduction) begins with the phrase:

*hayvânâtın min ciheti 'l-ḥalāka neşv ü nemā bulmalarına dā'ir 'ale 't-tevālî kesb-i cesāmet eylemelerine mütedā'ir ifādāt-ı müfīde-i 'umūmiyye beyânındadır*¹⁵

(This section comprises general beneficial statements regarding the growth and gradual increase in size of animals by the chain of creation.)

It concludes with the Qur'anic verse: "*wa-ja 'alnā mina 'l-mā'i kulla shay'in ḥayy*" (Enbiya 21:30), meaning "We made every living thing from water." A subsequent sixteen-page section, is titled:

şan'at-ı ṭabābet ve 'ulūm-ı ṭabī'iyye ve 'ale 'l-ḥuşuş fenn-i hayvânâtın taḥşîlinde ḥur-dabînîn isti 'māline dā'ir ma 'lūmātın nef'i ve fā'idesi beyânındadır

(On the benefit and usefulness of using microscopes in the acquisition of medical knowledge and the natural sciences, and particularly in the study of zoology),

¹³ A notable thematic overlap between Macarlı Abdullah Bey's work and that of Brandt & Ratzeburg is found in their treatment of leech therapy (*sülüğün tıpta isti 'mālî*), a subject that ceased to appear in both European medical zoology texts after Brandt and in Ottoman *'ilm-i Hayvânât-ı tıbbî* texts after Abdullah Bey. Strongly influenced by Avicenna, the use of leeches in European medicine remained prevalent until the mid-nineteenth century to the extent that it caused shortages. However, by the end of the century, due to its incompatibility with emerging disciplines such as modern physiology, pathology, and microbiology, leech therapy lost credibility and came to be viewed as a form of quackery, especially when practiced by unqualified individuals. Berrin Okka, "Hirudotherapy from Past to Present", *European Journal of Basic Medical Sciences* (2013), 61–65.

¹⁴ Miralay Macarlı Abdullah Bey, *Fenn-i Hayvânât-ı Tıbbiyye*.

¹⁵ General beneficial explanations concerning the development and continuous growth of animals in relation to their creation.

This section focuses on the microscope's importance in scientific investigation. It ends with the phrase "*temmet muḳaddime* (the introduction is completed)" indicating that it constitutes a continuation and conclusion of the *muḳaddime* itself. Within the first fourteen pages of the *muḳaddime*, animals are presented in a hierarchical progression, beginning with simple aquatic organisms and advancing to more complex life forms. The rationale for this ordering is explained by the idea that life first emerged in water and that water constitutes the fundamental source of life for all living beings. The *muḳaddime* also includes a tripartite temporal framework—*Devr-i evvel*, *Devr-i şânî*, and *Devr-i sâlis* (first, second and third epoch)—that outlines the stages of the Earth's creation and the subsequent emergence of life upon it.

The topics in the book follow the classification scheme presented in the *muḳaddime*, beginning with unicellular organisms and continuing through thirty-two classes, examined under headings such as *sārḳūdinālār* (sarcodines), *zūofütler* (zoophytes), *équinozoaires* (echinoderms), *annelides* (annelids), *condilopodes* (possibly a variant of myriapods or crustaceans), *hayvânât-ı na'îmeler* (soft-bodied animals), and *fıḳarâtiyyeler* (vertebrates).¹⁶ For each class, the author adopts a consistent template with several subheadings. Under the heading *haşîşa-i zâtiyye* (essential characteristics), detailed morphological and anatomical descriptions are provided, along with information on the natural habitat of the animal and representative examples belonging to the respective class. Under *tevellüd ve tekessürleri* (reproduction and propagation), modes of reproduction are described. The section titled *âlât-ı deverân-ı dem* explains the circulatory system (*circulation du sang*), while *fî'l-i teneffüs* discusses the respiratory system (*fonction de la respiration*). The nervous system (*système nerveux*) is addressed under *cümle'-i aşabiyye*, and movement is described under locomotion (*sevk ve hareket*). Feeding mechanisms are detailed under *tegaddî* (nutrition), and *âlât-ı hissiyye* covers the sensory organs (*organes des sens*). Throughout the text, French equivalents of key terms are provided in parentheses, reflecting the scientific language conventions of the period.

Abdullah Bey offers an exceptionally detailed treatment of helminths¹⁷, especially tapeworms (*tenyâ*). Beginning on page sixty-seven, under the heading *Kısım-ı Râbi': Annalid, Ḥarâtîniyye Beyânındadır* ("Section IV: On the Annelids, concerning the Ḥarâtîniyye"), a total of 112 pages is devoted to the study of

¹⁶ The book's table of contents is provided in the appendix section at the end of the article.

¹⁷ Parasitic worms such as tapeworms, liver flukes, ascarids, or leeches.

parasitic organisms. Notably, a marginal note beneath the section heading encapsulates the scope of medical zoology with remarkable clarity:

It should be known (*ma 'lūm ola ki*) that the animals contained within this section are related and connected (*ta'alluḡ ve münāsebeti*) to medicine in various respects (*vücūhıyla tıbbı*). Thus, we hereby notify (*ihtār ederiz*) that we shall engage in greater detail (*daha ziyāde taḡşīlātına*) than in the previously discussed animal classes (*bālāda muḡarrer aḡsām-ı ḡayvānāt*).¹⁸

In *Fenn-i ḡayvānāt-ı Tıbbiyye*, while describing the morphology, reproduction, and transmission pathways of parasitic organisms, additional information is provided on the specific species found in various countries—such as Greenland, Switzerland, Poland, Russia, Iceland, England, India, and Egypt—and on how transmission occurs based on the lifestyle of the local populations and the intermediary animals involved.

It is reported that during heavy rains (*bārān-ı kesīre*) in India, soldiers living in tents¹⁹ (*ḡayme niṡn ordu efrādı*) who bathe in contaminated water are afflicted with the worm above (*dūd*). The emergence period (*müddet-i zuḡūr*) of this worm may require several months, or even up to a year, and it is known that locals are more commonly infected with the *dūd-ı medīne* than foreigners. The presence of the *dūd-ı Yemen* has also been observed in regions such as the Hejaz, Yemen, Africa, Senegal, Angola, Asia, Greater India (*Hindistān-ı kebīr*), and Persia (*'Acemistān*), and even in the Americas. It has not yet been documented among Europeans except those residing in the aforementioned endemic regions.²⁰

In *Fenn-i ḡayvānāt-ı Tıbbiyye*, authored by Macarlı Abdullah, references are made to several prominent figures in nineteenth-century zoology and medicine, including Van Beneden (d. 1910), Ernest von Siebold (d. 1885), Rudolf Wagner (d. 1864), F. A. Sigismund Leuckart (d. 1898), and Antoine Clot (d. 1868). These references are not in the form of direct quotations from their works but instead appear in passing whenever organisms discovered by them are mentioned. The book concludes with the following sentence:

This work on *fenn-i ḡayvānāt-ı tıbbī* was printed and completed at the press of the *Mekteb-i Tıbbiyye* during the tenure of His Excellency Marko Pasha, director of the *Dārü'l-Fünūn-ı Tıbbiyye-i Şāhāne*, in the month of *Rabī' al-Avval* of the Hijrī year 1293.

¹⁸ Ibid., 67.

¹⁹ “The so-called *dūd* larvae that penetrate the body through the skin while in water are referred to as *Les urolables*.” Hüseyin Remzi, *‘İlm-i ḡayvānāt-ı Tıbbiyye*, 2/164.

²⁰ Abdullah, *Fenn-i ḡayvānāt-ı Tıbbiyye*, 164.

Another work bearing the title '*İlm-i Hayvânât-ı Tıbbî*' is the three-volume set published in 1893²¹, based on lecture content delivered by Hüseyin Remzi and transcribed by his student Üsküdarlı Tevfik Efendi, subsequently revised by Dr. Hulûsi Râşid Bey (d. 1936).²² The volumes are organized as follows: the first volume is titled *Hayvânâtın Ahvâl-i 'Umûmiyyesi* [General Zoology], the second *Gayrı Fıkâriyye ve Tufeylât-ı Hayvâniyye* [Invertebrates and Parasites], and the third *Hayvânât-ı Fıkâriyye ve Sediyye* [Vertebrate Animals and Mammals].

The first volume of Dr. Hüseyin Remzi's '*İlm-i Hayvânât-ı Tıbbiyye*' comprises 232 pages, contains no illustrations, and focuses primarily on vertebrate physiology. At the beginning of the volume, there is a four-page introductory statement titled *ifâde*, which opens with the salutation "Efendiler!" (Gentlemen!). This section bears the signature of *Dr Kolağası Hüseyin Hulûsi*, instructor of '*İlm-i hayvânât*' at the *Mekteb-i Tıbbiyye-i Şâhâne*.²³ In this introduction, Dr Hulûsi references scientific advancements in Europe and emphasizes that the discipline of bacteriology emerged as a direct result of zoological research. He asserts that grasping bacteriology without first understanding zoology in its entirety is impossible.

Dr. Hulûsi also highlights the extensive theoretical and practical knowledge of Hüseyin Remzi, who taught '*İlm-i hayvânât*' for twenty years at the *Mekteb-i Tıbbiyye*. He notes that while the zoological instruction spans several years in the European institutions, thanks to Hüseyin Remzi, the entire curriculum at the *Mekteb-i Tıbbiyye* is effectively completed and comprehended within a single academic year through sixty instructional sessions (*bir sene-i tedrise müddeti olan altmış derste ikmal-i tedris ve tefhim*). Additionally, following the *ifâde* section, an eight-page *muqaddime* (introduction) underscores the importance of acquiring knowledge about nature.

The second volume, titled *Gayrı Fıkâriyye ve Tufeylât-ı Hayvâniyye* (Invertebrates and Parasites), spans 344 pages and contains no illustrations. The book begins with *hayvânât-ı ibtidâ'iyye – embranchement protozoaires* (primitive animals – protozoan branch) and concludes with *beşinci sınıf: sefâlûpût* (Class Five: Cephalopods), covering approximately 150 topical headings. Hüseyin Remzi frequently indicates whoever discovered particular microscopic organ-

²¹ Unat, *Tıp Zoolojisi ve Parazitoloji*, 27.

²² Hüseyin Remzi. '*İlm-i Hayvânât-ı Tıbbiyye*.'

²³ Unat notes that Doctor Kolağası Hüseyin Hulûsi signs the foreword (*ifâde*) of the first volume of '*İlm-i Hayvânât*', indicating that the review was likely conducted by Hulûsi ibn Râşid, the assistant and later successor of Hüseyin Remzi.

isms and whenever they were identified. Considering that the book was published in 1893 and the courses were taught even earlier, these dates demonstrate how closely Hüseyin Remzi followed contemporary European scientific developments.²⁴

The same is true for the case studies cited throughout the work. While Hüseyin Remzi draws examples from India, America, and Europe, he also includes local cases and personal experiences from within the Ottoman territories, thereby integrating regional observations into the broader framework of medical zoological inquiry.

... The observations of *Kehhāl Miralay izzetlū 'Abdunnūr Bey* are particularly noteworthy (*müşāhedātū shāyān-ı dikkattir*). To elaborate: in the Gregorian year 1879, corresponding to the Hijrī year 1292, a worm (*dūd*) was found in the *cism-i zujājī* (vitreous body) of the left eye of a thirteen-year-old child. In the same year, another was located in the *bayt-i mu'ahhar* (posterior chamber) of the left eye of an eighteen-year-old. Furthermore, in 1886 (Hijrī 1293), two striped worms (*dūd-ı mukayyed*) were observed in a single eye.²⁵

... Let me recount one particular incident I witnessed (*hele kendi gördüğüm şeylerden bir tanesini beyān edeyim*): I saw a child, around four years old, who suddenly experienced an attack resembling a seizure (*sarāya müşābih bir savlet*). I immediately intervened to ensure the episode passed without harm. The child became relaxed. Immediately thereafter (*der 'akab*), I administered *santonin*. A large, toothed roundworm (*soğulcan*) was expelled. Although several others also emerged, once that enormous serpent-like *āskārīd* (*Ascaris*) was released, the child's eyes lit up (*gözü açıldı*). No further seizures occurred.²⁶

... It has been widely observed in Asia (*Asyā'da pek çok görülmüştür*). This affliction is not confined to the Hījāz, especially Medina, but can be found throughout all of Arabia. Medical records (*sicillāt-ı Tıbbiyye*) note that in 1877, among the soldiers dispatched by Muṣṭafā 'Āsım Pasha to the Yemen region, thread boils (*iplik çıbanı*)²⁷ were seen at a rate of seventy-five percent in one thousand soldiers.²⁸

It is evident from the lecture notes compiled by his student that Hüseyin Remzi

²⁴ Sample case records from Doctor Miralay Hüseyin Remzi's second volume of *'Ilm-i Hayvānāt-ı Tıbbiyye*, 11, 21, and 109.

²⁵ Ibid., 65.

²⁶ Ibid., 127.

²⁷ The disease known as 'iplik çıbanı' (thread boil) is described in detail under the title Fourth Species: Dūd al-Medīne Filiale Elmédine, 166–167.

²⁸ Ibid., 172.

did not rely solely on the European sources in his courses, but also frequently referred to figures from the history of science in the Islamic world. He often cited and discussed the works of Ibn Sīnā (d. 1037) and Abū Bakr al-Rāzī (d. 925). On page sixty of the book, during his discussion of the topic *Nev'-i sālīs: Dūd al-wahīd* (*tenia solium*), Hüseyin Remzi is seen to introduce a quotation from Ibn Sīnā with words of praise, reflecting both reverence and scholarly engagement.

The resolution of this matter is addressed in the fifth chapter (*makāla-i ḥāmise*) of the book titled *Kānūn* by the renowned figure known as Ibn Sīnā, who is celebrated among the Arab physicians (*aṭibbā'-i 'Arab*) as the noble and distinguished one (*serbülend ve mümtāz*), the successor and true heir (*hayr al-halaḥ*) of Hippocrates and Galen in medicine, and of Aristotle in philosophy (*ṭabābette Buḳrāṭ ve Jālīnūs'un ve falāsifede Aristū'nun sāni ve hayr al-halaḥ olan*).

Following this introductory sentence, Hüseyin Remzi includes an extended excerpt from the section titled *jumlat al-kalām fī al-dīdān* ("A General Discourse on Worms") in Ibn Sīnā's *al-Ḳānūn fī al-Ṭibb* (*The Canon of Medicine*), accompanied by his marginal glosses (*sharḥs*) and interpretative notes (see: Figure 2). Likewise, on page 170, while discussing the subject of *Dūd al-Medīne – Filaire Elmédine*²⁹, he provides an example in which he compares the experiences of both Ibn Sīnā and Abū Bakr al-Rāzī:

In conclusion (*ḥāşıl-i kalām*), the Arab physicians (*aṭibbā'-i 'Arab*), Ibn Sīnā and al-Rāzī, report that they had, in general, extracted 30, 40, or even 50 threadworms (*iplik kurtları*) from their patients. Threadworms (*iplik kurdu*) may be found in any individual; age (*sīn*), ethnicity (*'irḳ*), gender (*jins*), or species/class (*naw'*) have no bearing on susceptibility.³⁰

In his lectures, Hüseyin Remzi frequently incorporated statistical data, using case studies to explain various parasite-related factors, such as age, gender, prevalence rates, and cross-country comparisons, supported by these statistics. In the last eleven pages of the second volume, he provides a detailed list and descriptive overview of fifty works he authored. In all volumes, the technical terms appearing in section headings are presented in both Ottoman Turkish and French.

²⁹ *Dracunculus medinensis*, also known as the Guinea worm or 'dragon worm,' is a nematode causing severe inflammation and pain.

³⁰ *Ibid.*, 170.

Published in 1902, *‘İlm-i Hayvânât-ı Tıbbî*³¹ by Hulûsi ibn Râşid (d. 1936)–who began working as an assistant to Dr Hüseyin Remzi Bey at the *Mekteb-i Tıbbiyye* in 1889 and succeeded him as instructor of *‘ilm-i hayvânât* following Remzi’s death–was printed at the press of the *Mekteb-i Tıbbiyye-i ‘Askeriyye-i Şâhâne* (Imperial Military Medical School). The inner cover page includes the following statement:

It was translated through compilation and arrangement (*jam ‘ve tertîb şûretiy-le terceme olunarak*) from the authored works (*âsâr-ı mu’ellefe*) of the individuals named Klaus³², Raphaël Blanchard³³, Railliet³⁴, and Colin³⁵. The work was printed at the press of the *Mekteb-i Tıbbiyye-i ‘Askeriyye-i Şâhâne* (Imperial Military Medical School), with the approval (*taşdîk*) and authorization (*rûhşat*) of the High Commission for the Examination of Texts (*taḥkîk-i mu’ellefât Komisyon-ı ‘Âlîsi*).

Below are the subject headings featured in the book. Since the author occasionally uses parentheses, simplified clarifications provided by the author of this article are enclosed in square brackets.

The subject headings of the first part include: *Aḥvâl-i ‘umûmiyye of ‘ilm-i hayvânât* [general principles of zoology], differences between *nebâtât* and *hayvânât* [plants and animals], *ensice’-i hayvânât* [animal classes], and *vazâ’if-i hayâtîyye* [vital functions], which are described as involuntary activities that animals, like plants, must carry out to sustain life. These functions are therefore also referred to as *vazâ’if-i ‘uzviyye-i hayât-i nebâtî* [organic functions of vegetative life]. Further topics include: thirst and hunger in animals; *a’zâ-i tenâvuliyye-i hayvânât* [organs used to bring food to the mouth]; circulation of blood; respiration; *harâret-i garażiyye* [animal heat]; *tegaddî* [nutrition]; secretions; *iḥtisâsât-i hayvânât* [sensation]; *harekât-i hayvânîyye* [animal motion]; animal rest, sleep, and hibernation; *cümle’-i ‘aşabiyye* [the nervous system]; *sevk-i tabî’î hayvânî ve melekât-i ‘akliyye* [instinct and intellectual faculties]; *lisân ve ifâde-i hayvânât* [animal language and expression]; *tenâsül-i hayvânî* [animal reproduction]; *neşv u nemâ-yi ruşeym – tekevvün-i ruşeym* [embryogenesis]; *ta’alluḡ of the ‘uzviyye-i beden-i hayvânî with its surrounding environment*

³¹ Hulûsi ibn Râşid, *‘İlm-i Hayvânât-ı Tıbbiyye*, (İstanbul: Mekteb-i Tıbbiyye-i Askeriyye-i Şâhâne Matbaası, 1902).

³² Carl Friedrich Wilhelm Claus (d. 1899).

³³ Raphaël Anatole Émile Blanchard (d. 1919).

³⁴ Alcide Louis-Joseph Railliet (d. 1930).

³⁵ Gabriel Colin (d. 1896).

[animal body's relation to its habitat, i.e., ecology]; the relationship of animals with the inanimate world; their relationship with humans; harmful animals (*hayvânât-ı muđirra*); beneficial animals (*hayvânât-ı nâfi'a*); and *taşnîf-i hayvânât* [taxonomy]. In the second part, which focuses on the *ahvâl-i huşûşîyye of 'ilm-i hayvânât* [specific conditions of zoology], he begins with *hayvânât-ı ibtidâ'iyye* [unicellular organisms] and proceeds to illustrate sixteen orders (*tâ'ife*), presenting the tribes (*kabile*) and genera (*jins*) of the animals under each category, accompanied by visual representations.

Finally, the work discusses primates, addressing orangutans, monkeys, chimpanzees, and gorillas. In his treatment of primates, Hulûsi ibn Râşid classifies them as *zû'l-aẓâfîr* [clawed or nail-bearing animals] and refers to the studies of Paul Topinard (d. 1911) and Hippolyte Cloquet (d. 1840). Drawing on these sources, he emphasizes that although monkeys may resemble humans in appearance, they differ significantly in terms of *zâviyye-i vechiyye* [facial angle], cranial volume, jaw structure, the arrangement of teeth, and total tooth count. The book is 767 pages long, richly illustrated, and presents technical terms in Ottoman Turkish and French (the latter given in parentheses).

The author of the fourth work listed under '*ilm-i hayvânât-ı tıbbî*' is İsmâil Hakkı Bey (d. 1939), who was one of several students selected during the first year of the *Mekteb-i Baytâriyye* (School of Veterinary Medicine) to be sent to the Alfort Veterinary School³⁶ in Paris for training. After completing a four-year education in Paris, İsmâil Hakkı and his colleagues returned to İstanbul in 1896, where each was appointed as instructor (*mu'allim*) for a specific course. The inclusion of '*ilm-i hayvânât-ı tıbbî*' in the curriculum, previously absent from the veterinary school's syllabus, also took place after 1896, precisely when İsmâil Hakkı and his peers assumed their teaching roles. This period is referred to by Subhî Edhem (d. 1920) as the *devr-i teceddüd* [era of renewal] for the *Mekteb-i Baytâriyye*.³⁷

İsmâil Hakkı Bey initially served as an assistant instructor (*mu'allim mu'avinî*) in zootechnics at the *Askerî Baytâr Mektebi*. In 1898, he was appointed as the

³⁶ Claude Bourgelat established the world's first veterinary school in Lyon in 1761. The school later became the Royal Veterinary School in 1764. He also founded the École Nationale Vétérinaire d'Alfort in 1765. (Michigan State University College of Veterinary Medicine, 11 March 2019).

³⁷ The development of veterinary education in the Ottoman Empire began in 1841 with the invitation of Prussian veterinarian Godlewsky. The Civil Veterinary School (Mülkiye Baytâr Mektebi) was established in 1889 following various reforms. [Subhî Edhem, *Nevsâl-i Baytârî*, trans. Seda Tan. İstanbul: Liberus Kitap, 2024, pp. 25–55.]

instructor of ‘*ilm-i hayvânât-ı tıbbî*’ at the *Mülkiyye Baytâr Mektebi*.³⁸ In 1909, when the military and civilian medical schools were merged and the *Dârü’l-fünûn*’s *Faculty of Medicine* was established in Haydarpaşa, İsmâil Hakkı Bey, who was then the instructor of *hayvânât-ı tıbbî*³⁹ (medical zoology), authored a comprehensive three-volume work entitled ‘*İlm-i Hayvânât-ı Tıbbiyye ve Zirâ’iyye*’⁴⁰ (Medical and Agricultural Zoology). The influence of Alcide Louis-Joseph Railliet (d. 1930), under whom İsmâil Hakkı studied at the Alfort Veterinary School, is evident both in the book’s title and in the systematic structure of its content.⁴¹ Volume I of ‘*İlm-i Hayvânât-ı Tıbbiyye ve Zirâ’iyye*’ comprises 578 pages, Volume II contains 545 pages, and Volume III consists of 363 pages; all volumes are illustrated.

The first volume begins with a seven-page table of contents (*fihrist*), followed by an eleven-page *ifâde-i merâm* [statement of purpose] signed by İsmâil Hakkı himself. In this section, İsmâil Hakkı Bey discusses the significance of studying nature (*tabî’ât*) and outlines key developments in the discipline of zoology:

Since foundational and general knowledge related to *târîh-i tabî’* (natural history) and ‘*ilm-i hayvânât*’ (zoology) have already been taught at the *mektebât-i i’âdî* (preparatory schools), our purpose here is to prepare the necessary groundwork to strengthen our students’ entry into their respective branches and professions. Therefore, we will study ‘*ilm-i hayvânât-ı tıbbî*’ (medical zoology), and in doing so, we must give particular emphasis to *tufeylât-i haywânîyye* (animal parasites). Thanks to the increasingly apparent (*günden güne tecellîsâz*) scientific advancements and investigations (*terakkîyât ve tahkîkât-i fenniyye*), ‘*ilm-i hayvânât-ı tıbbiyye*’ has reached such a level of development that it now branches into distinct subfields—*protozoolojî* [protozoology], *hayvânât-i ibtidâ’iyye* (primitive animals, i.e., microbial organisms), ‘*ilm al-dîdân*’ (helminthology), ‘*ankebûtiyyât*’ (arachnids), *lingatullâr* (possibly *Lin-guatula*, tongue worms), *akârât* (mites), and insects such as particular species from the *cenâhiyyet al-nisf* class (Hemiptera), and especially from *zû’l-cenâheyn* (Diptera). Should the current pace of scientific advancement continue its elevation on the highway of progress (*shahrâh-i tekâmül*), which is beyond doubt, then very soon, the subfields above encompassed under the name ‘*ilm-i hayvânât-ı tıbbiyye*’ will no longer be grouped under a single discipline but instead will become independent sciences each requiring their own instructions. Indeed, in Europe, for the past several

³⁸ Unat. *Tıp Zoolojisi ve Parazitoloji*, 82–85.

³⁹ Sevtap İshakoğlu, “Botany, Zoology, and Geology Education at Darülfünun and İstanbul University Faculty of Science (1900–1946)”, *Osmanlı Bilimi Araştırmaları* (June 1998), 320.

⁴⁰ İsmâil Hakkı, *İlm-i Hayvânât-ı Tıbbiyye ve Zirâ’iyye* (İstanbul: Matbaa-i Âmire, 1910).

⁴¹ Louis-Joseph Alcide Railliet, *Zoologie Médicale et Agricole* (Paris: Asselin et Houzeau, 1885).

years, specialists have been trained in each of these branches. Experts now exist in *ḥayvānāt-i ibtidā'īyye* (unicellular organisms) and *dīdān* (worms), and even among insects, there is now a growing number of physicians and naturalists who specialize solely in the *zū'l-cenāḥeyn* class—*Dipterologistes* (dipterists).

İsmail Hakkı Bey strongly emphasizes that, rather than attempting to grasp an entire scientific discipline in its totality, it is far more valuable to specialize in a particular area. Otherwise, he argues, knowledge remains superficial and yields limited results. He explains that, due to the presence of the term *ḥayvānāt* in the title of his book, he considered it appropriate to include in the first section certain animals not directly related to the field of medical science, treating them within a broader context of biology. However, he explicitly states that, despite the general zoological scope suggested by the book's title, he did not address *fuṭūr* (fungi), which belong to botany. For this reason, the book should not be classified as a work on parasitology, even though its content on *tufeylāt-i ḥayvāniyye* (animal parasites) closely aligns with parasitological studies. In the excerpt below, taken from the *ifāde-i merām* (statement of purpose), İsmail Hakkı Bey clearly articulates the distinction between parasitology and *'ilm-i ḥayvānāt-ı tıbbī*.

The characteristics (*evşāf*) and biological aspects of parasites (*tufeylāt*)—that is, their growth and development (*neşv u nemā*) and modes of transmission (*şūret-i intikāl*)—are identical in both fields and never vary. However, a difference may be observed in the way the diseases they cause (*emrāz*) and their treatment (*tedāvī*) are addressed. Whereas *parasitology* provides a detailed discussion of both the pathological and therapeutic dimensions, *'ilm-i ḥayvānāt-ı tıbbī* addresses these matters in a more concise manner (*şūret-i muhtaşare*), offering only general information (*beyān-i ma'lūmāt*) without entering into extensive elaboration. Moreover, information concerning diseases (*emrāz*) is more detailed in other courses offered in the upper years of study. Given the sheer volume of material to be taught within the scope of *'ilm-i ḥayvānāt-ı tıbbī* and the particular importance of parasites (*tufeylāt*), a new course titled “Parasitology” has been introduced into the faculty curriculum as of this year, following the model adopted in European faculties.

İsmail Hakkı Bey placed considerable emphasis on the importance of both bacteriology and parasitology for humanity, drawing particular attention to the fact that, unlike parasites, which tend to have slower rates of spread and reproduction, bacteria are far more dangerous due to their omnipresence and rapid proliferation.

As scientific investigations and inquiries (*taḥkīkāt ve taḥarrīyāt-i fenniyye*) have advanced, and as the essence (*künh*) of infectious and microbial diseases has become

better understood, it has been revealed that many animal–origin microbes (*hayvānī mikrob̄lar*) and bacteria are, by themselves, incapable of directly inflicting harm (*ʿīrās-ı ḥasār*) on the organism (*ʿuḫviyyet*). For them to enter the body, the existence of a breach in continuity (*tefrīḳ-i ittiṣāl*) or an access point (*bāb-ı duḥūl*) is often–if not always–necessary. Thus, the formation of an abscess (*ḥurāj*), a puncture (*vaḥz*) in the tissues (*ensāj*), a laceration (*shakḳ*), or the presence of a wound (*jerīḥa*) becomes a precondition. These punctures (*vaḥzāt*), cuts (*shukūk*), and separations of continuity (*tefrīḳ-i ittiṣāl*) arise from various causes. Among these causes are certain aquatic parasites (*tuḥeylāt-i māʿiyye*), mites (*akārāt*), and some insects belonging to the classes *zūʿ-l-cenāḥeyn* (Diptera) and *cenāḥetu al-niṣf* (Hemiptera). For instance, *Anopheles* mosquitoes are involved in the transmission of *ḥummāʿ-ī marzūkī* [malarial fever], ticks in *piroplasma* diseases, *cholera flies* in certain enteric infections, *Stegomyia* mosquitoes in *ḥummā-ī aṣfar* [yellow fever], and bedbugs (*taḥtakurular*) in *ḥummā-ī rājiʿa* [relapsing fever]. Through the actions (*vuḥūzāt*) of these vectors, bacteria gain entry into the organism.

Similarly, waterborne worms (*dīdān-ı māʿiyye*) also facilitate the spread of bacteria into the body via the intestinal route. In the wake of these investigations, it has become clear that bacteria and microbes cannot be regarded as pathogenic agents (*ʿavāmil-i merdīyye*) in isolation. In this regard, the functions (*vazāʿif*) of worms (*dīdān*) and insects (*ḥaṣherāt*) must be taken into serious consideration.

İsmail Hakkı notes that increased ease of travel between countries, due to commerce, tourism, and civil service, has led to more frequent interaction between populations from temperate and tropical regions. As a result, diseases that were once confined to specific climates have begun to appear outside their endemic zones. He reports that, in response to this trend, countries such as Germany (in Hamburg), England (in London and Liverpool), and France (in both Paris and Algiers) have established *Instituts de médecine coloniale* to study and address diseases associated with foreign or tropical environments. He also notes that ninety percent of tropical diseases have been identified as parasitic. Following his *ifāde-i merām* (statement of purpose), İsmail Hakkı Bey includes a two–page *medhal* (introduction) in which he informs the reader about the methodological approach he intends to follow in the work.

ʿİlm-i ḥayvānāt is by nature a vast and exalted discipline (*ziyādesiye vāsiʿ bir ʿilm-i ʿaẓīm*), and it is virtually impossible to attain complete mastery or comprehension of it (*lāyīḳ-i vejḥ ile iḥāṭa ve taḥṣīlī gayr-i mumkin*). For this reason, natural scientists (*ʿulemā-ī ṭabīʿiyyūn*) have been compelled to divide this science into multiple branches, depending on its practical applications in fields such as medicine, agriculture, and industry (*ṭabābet, zirāʿat ve ṣanāyiʿ*). Consequently (*bināʿen ʿaleyh*), due to its various implementations, the field may be studied separately under such headings

as 'ilm-i ḥayvānāt-ı tıbbī (medical zoology), 'ilm-i ḥayvānāt-ı zirā'ī (agricultural zoology), and 'ilm-i ḥayvānāt-ı şinā'ī (industrial zoology), among others. In this book, we will primarily examine those animals that are harmful (*iẓrār eden*) to human beings (*nev'-i beşer*) and domesticated species (*ḥayvānāt-ı ehliyye*), as well as animals that provide medical substances (*mevādd-i tedārük*) used in treatment (*ṭabābet*) or that damage or protect cultivated fields (*mezrū'āt*). Thus, our focus will be chiefly on *ḥayvānāt-ı tıbbī* and, to some extent, *ḥayvānāt-ı zirā'ī*.

İsmail Hakkı Bey divides the first volume into two parts. In the first part, he addresses the topics of 'ilm-i ḥayvānāt-ı 'umūmī [general zoology], structuring it into four chapters (*fāsl*). The first chapter, titled *ḥayvānāt* [animals], provides definitions of animals, distinctions between living and non-living beings, and the differences between plants and animals. The second chapter, titled *ta'āzu ve neşv u nemā-yi ḥayvānāt* [growth and development of animals], discusses the structure and functions of cells, tissues, and organs. The third chapter, *uẓviyyetin bulunduǧu mahall ve muḥīṭi ile munāsebeti* [the relationship between the organism and its environment], focuses on the interaction of animals with their surroundings, including natural selection, heredity, parasitic organisms, and habitats. The fourth chapter, *taşnīf-i ḥayvānāt* [taxonomy of animals], is dedicated to the principles of classification, the historical development of taxonomy, species differentiation, and the laws governing biological growth.

From the second part of the first volume through to the end of the third volume, the work continues under the heading 'ilm-i ḥayvānāt-ı huşūşī [special zoology], systematically presenting animal groups from unicellular organisms to complex life forms. These are organized hierarchically according to *şu'be* (branch), *fırka* (division), *şinf* (class), *familia* (family), *ejnas* (genus), and *envā'* (species), with both morphological and anatomical descriptions.

At the end of the first volume, İsmail Hakkı is seen to have inserted a horizontally oriented and extended chart folded into several pages. This diagram explains parasitic animals, their species, and their hosts. The first volume of the three-volume work concludes with the topic *dīdān-ı sharīṭiyye* [cestodes, or tapeworms]. The second volume opens with *dīdān-ı şibh-i hayīyye: Nemahelminthler* [threadlike worms: nematodes] and concludes with *ḥayvānāt-ı nā'ime merjūlu'r-re's*: *Cephalopodes* [soft-bodied, head-footed animals: cephalopods]. The third volume begins with *the eighth şu'be: Chordates* [Chordates] and ends with *zātu'l-sedāyā: Beşeriyye* [those possessing speech: humankind].

Conclusion

When examining works from Europe that bear titles corresponding to the concept of *medical zoology* in their original languages, the earliest example that emerges is the two-volume *Medizinische Zoologie*, co-authored by Johann F. Brandt (d. 1879) and Julius T. C. Ratzeburg (d. 1871) in the early nineteenth century. This work compiles animals that physicians and pharmacists are expected to know, particularly those commonly found in nature. The second work to appear chronologically is *Medical Zoology and Mineralogy*⁴² by John Stephenson, published in England in 1832. In these initial examples, animals were discussed regarding their therapeutic and industrial applications, rather than being considered pathogens. These works are also notable for their detailed descriptions of functional anatomy based on dissection findings and their frequent references to ancient authors and Islamic physicians.

By the mid-nineteenth century, the two-volume *Zoologie médicale* (1859)⁴³, co-authored by Paul Gervais (d. 1879) and Pierre-Joseph van Beneden (d. 1894), had come to the forefront of the European medical zoology literature. These two authors who were also cited by Ottoman *‘ilm-i hayvānāt* writers, were identified by Raphaël Blanchard as the founding figures of the discipline of medical zoology in France.⁴⁴ In their work, in line with the scientific and philosophical climate of the time, increasing emphasis was placed on the systematic classification of animals. The practical applications of animals receded into the background, while analyses of their physicochemical structures gained prominence. By the end of the nineteenth century, the works published under the heading of medical zoology in Europe began treating animals, especially parasitic species, as pathogens. The biology of these parasites and their impact on human health became central concerns, and research increasingly focused on the priorities of tropical medicine.⁴⁵ Thus, medical zoology emerged as a vital discipline for the diagnosis and control of infectious diseases and for understanding the transmission dynamics of parasitic organisms.

In the Ottoman Empire, the emergence of early examples of the discipline of

⁴² John Stephenson, *Medical Zoology and Mineralogy* (London: J. Wilson, 1832).

⁴³ Paul Gervais – Pierre-Joseph Van Beneden, *Zoologie Médicale* (1859).

⁴⁴ Raphaël Anatole Émile Blanchard, *Traité de Zoologie Médicale*, (Saint-Germain: Librairie J.-B. Baillière et Fils, 1889–1890), V–VI.

⁴⁵ On the global impact of tropical diseases and the foundation of colonial medicine institutes. [David Arnold, “Cholera and Colonialism in British India”. *Past & Present* 113 (1986), 118–151; Jean De Rycke, “Raphaël Blanchard (1857–1919)”, *Académie des sciences, arts et belles-lettres de Touraine* (2022).]

medical zoology coincided with the broader initiatives to modernize the education system in the early nineteenth century. Within the framework of higher education curricula, 'ilm-i hayvânât courses were initially structured under the domain of *ṭārīḥ-i ṭabī'ī* (natural history, or *mevâlid-i selâse / histoire naturelle*), and textbooks bearing these terms in their titles were used in instruction. The first figure to draw attention to medical zoology and introduce the subject into the realm of Ottoman higher education was Macarlı Abdullah. However, shortly thereafter, particularly due to the influence of students who had been sent to France for training, an increasing number of works began to appear under the title 'ilm-i hayvânât-ı tıbbî (medical zoology). These works largely followed recent European models, with a strong influence from Louis-Joseph Alcide Railliet and Raphaël Blanchard⁴⁶ In particular, Railliet's textbook served as a structural and thematic model for many Ottoman medical zoology texts. While Blanchard opened his work with protozoa, organizing his material from unicellular organisms to more complex ones and examining them morphologically, anatomically, and physiologically, Railliet's book begins with subjects more closely aligned with the philosophy of biology and general zoology. His introductory section—covering the distinction between organic and inorganic matter, the differences between plants and animals, the organism's struggle for life, animal organs and their functional division of labor, reproduction, and the relationship between organism and environment—was mirrored in the works of Ottoman authors, who addressed these topics individually in their treatises.

While Blanchard and Railliet included a significantly greater number of case studies, particularly on parasitic diseases, it is evident that Ottoman authors provided fewer examples and placed less emphasis on local cases. The European and Ottoman writers focused on diagnosing such cases, offering little to no discussion concerning treatment protocols.

The list of books provided within the main text reveals that there were several 'ilm-i hayvânât texts used in higher education that did not include the term *tıbbî* (medical) in their titles. Two tables have been appended to the end of the article to address how these types of works—those with and without the medical designation—compare in terms of content and structure. Table 2 presents the contents of the textbook 'İlm-i Hayvânât compiled and translated by Dr Rifat İsmail, who taught 'ilm-i hayvânât at the *Mekteb-i Tıbbiyye-i Mülkiyye* for ten

⁴⁶ Blanchard, *Traité de Zoologie Médicale*.

years until 1877. His work is based on translations from Milne-Edwards and Louis Figuier. Upon examination, Rıfat İsmail's textbook focuses on general zoological subjects with a physiological orientation. While the section on animal classification contains numerous headings, most are addressed only briefly, with a few lines of explanation and little elaboration. Notably, the topic of parasitic organisms is entirely absent from his treatment.

The index presented in Table 3 belongs to *‘İlm-i Ḥayvānāt* (1893), prepared by Hüseyin Remzi through the translation of the zoology section of Henri Bocquillon's *Manuel d'Histoire Naturelle Médicale*⁴⁷, a natural history textbook. In the preface (*muḳaddime*) of the work, it is noted that the book was prepared specifically for use in *‘ilm-i ḥayvānāt* courses at the *Dārü'l-Fünûn-ı Tıbbiyye* (Imperial School of Medicine). Upon examining the index, it becomes clear that—unlike Rıfat İsmail's work—considerable attention is given to parasitic organisms. This suggests that Hüseyin Remzi, who had been sent to France to follow medical developments closely, was acutely aware of the growing importance of medical zoology. This awareness likely influenced his decision when selecting the work he would translate.

By the nineteenth century, medical zoology in Europe had become an exceptionally dynamic field, propelled by the accelerating pace of scientific discovery. Ottoman instructors of *‘ilm-i ḥayvānāt-ı tıbbī* were closely attuned to these developments, rapidly transmitting information about newly discovered species and other scientific advancements to their academic communities. In doing so, they did not limit themselves to mere translation; they also produced original and sophisticated texts through both compilation and authorship. A review of the indices of these works reveals that the content is far from uniform. On the contrary, it reflects the field's ongoing transformation, its growing diversity, and the consistent incorporation of the most up-to-date scientific knowledge into the main corpus of the texts.



⁴⁷ Henri Théophile Bocquillon, *Manuel d'Histoire Naturelle Médicale*, (Paris: Germer Baillière, 1866).

Bibliography

- Akpınar, Mahmut. "Bir Saray Hekiminin Serencamı: İstefanaki Karatodori (1789–1867)". *Cumhuriyet Üniversitesi İlahiyat Fakültesi Dergisi* (2010), 173–184.
- Arnold, David. "Cholera and Colonialism in British India". *Past & Present* 113 (1986), 118–151.
- Ataç, Galip. *Tıp Eğitim Tarihçesi*. Trans. Cem Hakan Başaran. Ankara: Nobel Tıp Kitapları, 2017.
- Blanchard, Raphaël Anatole Émile. *Traité de zoologie médicale*. 2 vols. Saint-Germain: J.–B. Baillière et Fils, 1889–1890.
- Bocquillon, Henri Théophile. *Manuel d'histoire naturelle médicale*. Paris: Germer Baillière, 1866.
- Brandt, Johann Friedrich. *Medizinische Zoologie oder getreue Darstellung und Beschreibung der Thiere, die in der Arzneimittellehre in Betracht Kommen*. Berlin: Hirschwald, 1829.
- de Rycke, Jean. *Raphaël Blanchard (1857–1919), Pionnier de la médecine coloniale*. Tours: Académie des sciences, arts et belles-lettres de Touraine, 2022.
- Gervais, Paul. *Zoologie médicale: exposé méthodique du règne animal basé sur l'anatomie, l'embryogénie et la paléontologie*. 2 vols. Paris: Baillière, 1859.
- Hegner, Robert W. "Medical Zoology and Human Welfare". *Science* 60 (1924), 551–558.
- Hüseyin Remzi. *'İlm-i Hayvânât*. İstanbul: Mekteb-i Tıbbiyye-i Şâhâne Matbaası, 1290/1873.
- Hüseyin Remzi. *'İlm-i Hayvânât-ı Tıbbiyye*. 3 vols. İstanbul: Mahmud Bey Matbaası, 1311/1893.
- Ibn Râşid, Hulûsi. *'İlm-i Hayvânât-ı Tıbbiyye*. İstanbul: Mekteb-i Tıbbiyye-i Askeriyye-i Şâhâne Matbaası, 1902.
- İshakoğlu, Sevtap. "1900–1946 Yılları Arasında Darülfünun ve İstanbul Üniversitesi Fen Fakültesi'nde Botanik, Zooloji ve Jeoloji Eğitimi." *Osmanlı Bilimi Araştırmaları* (1998), 319–348.
- İsmâil Hakkı. *'İlm-i Hayvânât-ı Tıbbiyye ve Zirâ'iyye*. İstanbul: Matbaa-i Âmire, 1910.
- Michigan State University College of Veterinary Medicine. "Rinderpest and the First Veterinary School". Accessed in May 2024. <https://cvm.msu.edu/vetschool-tails/rinderpest-and-the-first-veterinary-school>
- Miralay Macarlı Abdullah Bey, *Fenn-i Hayvânât-ı Tıbbiyye*, trans. Miralay Ali Raşid Bey, İstanbul: Mekteb-i Tıbbiyye-i Şâhâne Matbaası, 1293/1876.
- Okka, Berrin. "Hirudotherapy from Past to Present". *European Journal of Basic Medical Sciences* (2013), 61–65.
- Raillet, Louis-Joseph Alcide. *Éléments de zoologie médicale et agricole*. Paris: Asselin et Houzeau, 1885.

- Richard, Achille. *Éléments d'histoire naturelle médicale contenant des notions générales sur l'histoire naturelle, la description de tous les aliments, médicaments ou poisons tirés des végétaux et des animaux*. Paris: Baillière, 1849.
- Stephenson, John. *Medical Zoology and Mineralogy: Illustrations and Descriptions of the Animals and Minerals Employed in Medicine*. London: J. Wilson, 1832.
- Subhi Edhem. *Nevsâl-i Baytârî*. eds. Seda Tan and Savaş Volkan Genç. trans. Seda Tan. İstanbul: Liberus Kitap, 2024.
- Rıza Tahsin. *Mir'ât-ı Mekteb-i Tıbbiyye*. İstanbul: Dersâdet Kader Matbaası, 1328/1911.
- Unat, Ekrem Kadri. *Osmanlı İmparatorluğu'nda Tıp Zoolojisi ve Parazitoloji*. İstanbul: Cerrahpaşa Tıp Fakültesi Yayınları, 1970.
- . “Macarlı Miralay Dr. Abdullah Bey'in Hayatı ve Türk Tıp Zoolojisindeki Yeri”. *Türk Mikrobiyolojisi Cemiyeti Dergisi* (1975), 7–18.
- . “Türkçe Tıp Zoolojisi ve Parazitolojisi Kitapları Dolayısıyla”. *Türk Mikrobiyoloji Cemiyeti Dergisi* (1977), 73.
- Yıldırım, Nuran. “Tıbhâne-i Âmire'den Dârülfünûn'a İstanbul Tıp Fakültesi'nde Fizyoloji”. *Osmanlı Bilimi Araştırmaları* (2024), 289–367.

Appendices

Table 1: Complete Contents of Miralay Macarlı Abdullah's *Fenn-i Hayvânât-ı Tıbbiyye*

Section	Content	Page
First Section (Kısm-ı Evvel)	Animals lacking vertebral columns (Hayvânât-ı ma'dümü'l-'amüd-ı fikâriyye)	2
First Class (Birinci Sınıf)	Amoeboid foot (Ricl-i meczûr)	4
First Class of Sarcodines (Sarkodîlerin Birinci Sınıfı)	First type of amoeboid organisms (Ricl-i meczûrların nev'-i evvelî) (Amoebides or protoidler)	6
Second Type (Nev'-i Sâni)	Bearing pseudopods (Hâmil-i sukbâd)	7
Second Class (İkinci Sınıf)	Many-vesicled and radiated forms (Kesîrû'l-kîse ve şu'â'yye)	8
Third Class (Üçüncü Sınıf)	Naked protozoa (Nâki'yye)	11
	Naked protozoa without stomach (Nâki'yye-i ma'dümü'l-mi'de)	15
Fourth Class (Dördüncü Sınıf)	Sponges (İsfenciyyeler) (Porifer)	19
	Medical use of sponge (Süngerin tıbbda isti'mâli)	23
Second Section (Kısm-ı Sâni)	Zoophytes or coelenterates (Hayvânât-ı nebâtî – Zoofit, Kolenterâta)	24
Fifth Class (Beşinci Sınıf)	Venomous polyps (Huveynât-ı zehriyye or polipler)	25
Sixth Class (Âltıncı Sınıf)	Jellyfish (Medüzer) (Medusaires, Acalephes)	38
Third Section (Kısm-ı Sâlis)	Spiny-skinned animals (Dü jild-i muşevvektî) (Ekinodermât)	49
Seventh Class (Yedinci Sınıf)	Star-like forms (Şibh-i necmiyyeler)	49
Eighth Class (Sekizinci Sınıf)	Echinoderms (Ekinoidler)	55
Ninth Class (Dokuzuncu Sınıf)	Holothurians (Holotoridler)	62
Fourth Section (Kısm-ı Râbi')	Worm-like animals (Harâtîniyye) (Enlîd)	67
Tenth Class ('Aşir Sınıf)	Turbellarians (Turbeller)	68
Eleventh Class (Sınıf-ı Hâdî 'Aşer)	Cotylids, named by Van Beneden (Kotilidler)	73
	Types of tapeworms (Dîdân-ı şerîtiyye)	95
	Medical use of leeches (Sülükün tıbbda isti'mâli)	128
Twelfth Class (Sınıf-ı Sâni 'Aşer)	Threadworms (Haytiyye) (Nematelminet)	140
Thirteenth Class (Sınıf-ı Sâlis 'Aşer)	Rotifers (Müdevverler) (Rotator)	179
Fourteenth Class (Sınıf-ı Râbi' 'Aşer)	Gephyrid worms (Jefiridler)	183
Fifteenth Class (Sınıf-ı Hâmis 'Aşer)	Silk-legged species (Ricl-i dü-ğarîr) (Şetopodid)	184
Sixth Section (Kısm-ı Sâdis)	Mollusks (Yumuşak gövdeli hayvanlar)	193

Twenty–First Class (Sınıf–1 Hādī ve ‘İshrīn)	Bryozoans (Bryozor)	195
Twenty–Second Class (Sınıf–1 Šānī ve ‘İshrīn)	Kamisia (Kamisia)	196
Twenty–Third Class (Sınıf–1 Šālīs ve ‘İshrīn)	Sipirobranchia (Sipirobrankie)	197
Twenty–Fourth Class (Sınıf–1 Rābī ve ‘İshrīn)	Lamellibranchs (Lamellibrankie)	198
	Cephalophores (Sephhalophores)	199
Twenty–Fifth Class (Sınıf–1 Hāmis ve ‘İshrīn)	Pteropods (Pteropod)	200
Twenty–Sixth Class (Sınıf–1 Sādis ve ‘İshrīn)	Gastropods (Gastropod)	201
	Containing gastropods (Haviyye Gastropodlar)	202
Twenty–Seventh Class (Sınıf–1 Sābī ve ‘İshrīn)	Cephalopods (Sephelopod)	203
Seventh Section (Kısm–1 Sābī)	Vertebrate animals (Zū ‘amūd–ı fikāriyye hayvanlar)	205
Twenty–Eighth Class (Sınıf–1 Šāmin ve ‘İshrīn)	Cetaceans (Hutiyyāt)	206
Twenty–Ninth Class (Sınıf–1 Tāsī ve ‘İshrīn)	Terrestrial reptiles (Zevāhif–i erziyye)	208
Thirtieth Class (Sınıf–1 Šelāšīn)	Reptiles (Sürüngenāt)	210
	Animals with spinal cord (Zū ‘aşab–ı zafarī hayvanlar)	211
Thirty–First Class (Sınıf–1 Hādī ve Šelāšīn)	Birds (Ṭayrāt)	212
Thirty–Second Class (Sınıf–1 Šānī ve Šelāšīn)	Human species (Beşeriyāt)	215

Table 2		Table 3	
This is the table of contents of 'Ilm-i Ḥayvānāt (1876), a book compiled by Rıfat İsmâil for the Mekteb-i Tıbbiyye-i Mülkiyye. It was prepared to provide a general overview. Therefore, specific genera have been intentionally omitted. Additionally, there are page numbering errors resulting from the book's typesetting. The original page numbers printed in the book have been retained to avoid confusion.		This is the table of contents of 'Ilm-i Ḥayvānāt (1893), prepared by Hüseyin Remzi for the Imperial Medical Faculty (Dârü'l-Fünûn-ı Tıbbiyye) through the translation of the zoological section of H. Bocquillon's Manuel d'histoire naturelle médicale (1866).	
Table of Contents	Page	Table of Contents	Page
Three Natural Kingdoms (Mevâlid-i Selâse)	2	Animals in general (Ale'l-'umûm ḥayvānāt)	3
Difference between inorganic and living bodies (Madeniyât ile ecssâm-ı nâmiyenin farkı)	3	Invertebrate animals (Ḥayvānāt-ı ma'dümü'l-fiḳarât)	6
Difference between animals and plants (Ḥayvānāt ile nebâtât farkı)	4	Primitive animals (Protozoa) (Ḥayvānāt-ı ibtidâ'iyye)	8
Types of natural animal functions (Efâl-i tabîiyye-i hayvâniyyenin eksâmı)		Sponges (İsfenciye)	15
Nutritive functions (Efâl-i igtizâiyye)		Polyps (Polip)	20
Absorption (İmtisâs)		Freshwater hydra or polyp (İdrâ yâhûd polip-i mâ'u'l-gaḍab)	
Organs responsible for absorption (Âzâ-i mahsusa-i imtisâs)		Coral (Mercân)	25
Food and beverages (Me'kulât ve meşrûbât)		Jellyfish with root-like appendages (Zu'l-ğam el-cezrî)	30
Digestion and its related organs (Hazm ve âzâ-i mahsûsası)		Echinoderms (Mukenfezû'l-cild)	33
Teeth (Dişler)	1	Sea cucumbers (Hûlûtûrî)	33
Liver (Kebd)	2	Starfish (Necmiyye)	37
Circulation of blood (Kanın devrânı)	2	Sea urchins (Kenâfûzu'l-bahrî)	38
Circulatory system (Cihâz-ı deverân-ı dem)		Worms (Dîdân)	40
Blood circulation in different animals (Ḥayvānāt-ı muhtelifede kanın devri hareketi)		Internal parasites (Dîdân-ı dâhilî)	40
Respiration (Teneffüs)	3	Tapeworms (Dîdân-ı şerîtiyye)	41
Respiratory systems in different animals (Ḥayvānāt-ı muhtelifenin teneffüsler)		Tenia (Tapeworm) (Tenya)	41

Respiratory system (Cihâz-ı teneffüs)		Bothriocephalidae (Zātu'l-ḥafire-i re's)	60
Excretion and secretions (İfrāgāt ve ifrāzāt [boşaltım ve salgılar])		Flatworms (Trematodes) (Dīdān-ı 'arīz)	63
Organs of secretion (Āzā-i ifrāzāt)	4	Liver fluke (Dūd el-kebd)	63
Substances replacing the decomposed (Bedel-i mā-yetehallelu)	4	Roundworms (Nematodes) (Dīdān-ı üstuvānī)	68
Animal heat (Harārāt-ı hayvāniyye)	4	Intestinal worms (Dīdān-ı em'ā)	68
Relative functions (Efāl-i nisbiyye)	6	Pinworm (Zātu'z-zenb-i raḳīḳ)	72
System of relative functions (Cihâz-ı efāl-i nisbiyye)	7	Whipworm (Zātu'r-re's eṣ-ṣirī)	74
Sensation (His)	7	Kidney worm (Strongylus) (İstrüṅḡıl (dūd el-kilye))	75
Nervous functions (Efāl-i āsāb)	8	Trichina worm (Tirişin (dūd eṣ-ṣi'ī))	78
Brain and spinal cord (Dimā ve nuḥā [Beyin ve ilik])	8	Filarial worm (Dūd el-meḍīne)	80
Sensory nerves (Āsābu'l-his)	8	Ancylostoma (hookworm) (İnsilüstüm (münḥanī'u'l-fūḥa))	81
Touch (Lānese [Dokunma])	8	Some major symptoms of parasitic worms (Dīdān-ı amānin bazı 'alāmāt-ı mūhimmesi)	83
Taste (Zāika [Tatma])	9	Annelid worms (Dīdān-ı ḥalḳiyye)	88
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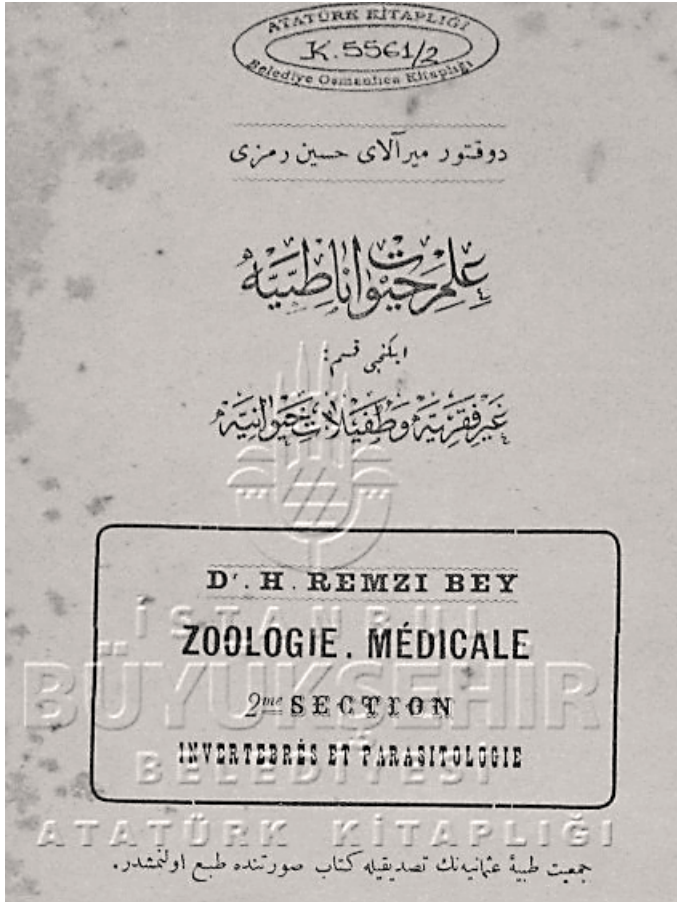


Figure 1: Cover page of the second volume, *Gayr-i Fıkâriye ve Tufeylât-ı Hayvâniye*, of Hüseyin Remzi's *İlm-i Hayvanât-ı Tibbiye*.

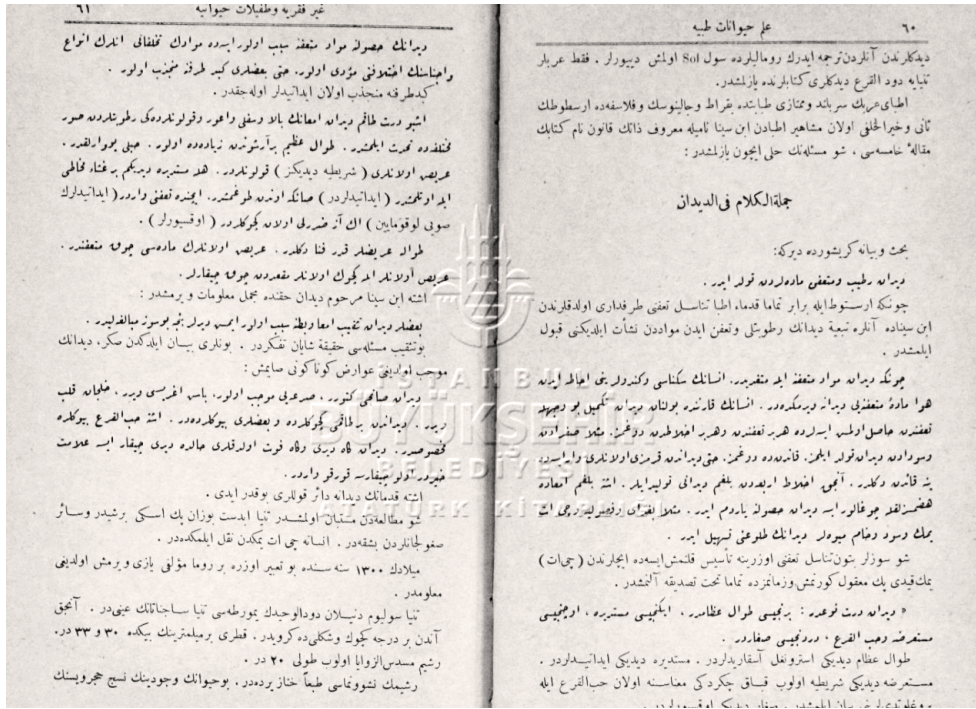


Figure 2: A quotation from Avicenna titled *Cümletü'l-Kelâm fî'd-Didân* in the second volume *Gayr-i Fikâriye ve Tufeylât-ı Hayvâniye* of Hüseyin Remzi's *İlm-i Hayvanât-ı Tıbbiye*. The dark-colored lines belong to Avicenna, while the lighter-colored lines indicate Remzi's commentary (pp. 60–61).

[illegible]

Figure 3: Tables illustrating statistical data presented by Hüseyin Remzi in *İlm-i Hayvanât-ı Tıbbiye* (pp. 170–171).

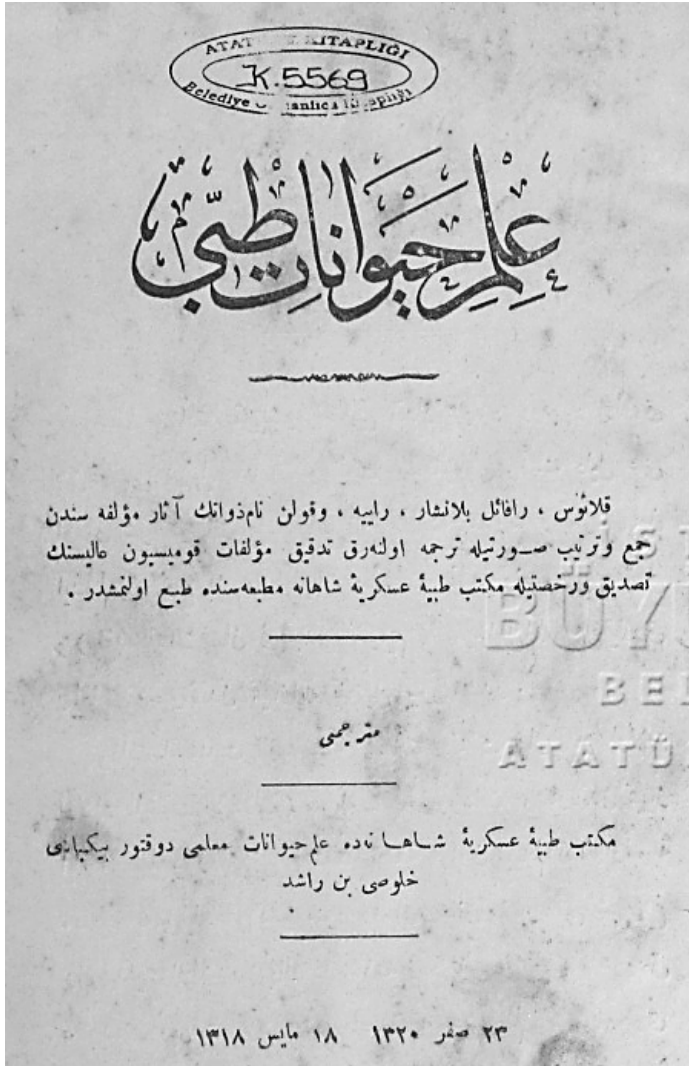


Figure 4: Cover page of Hulûsî B. Râşid's book titled *İlm-i Hayvânât-ı Tıbbî*.

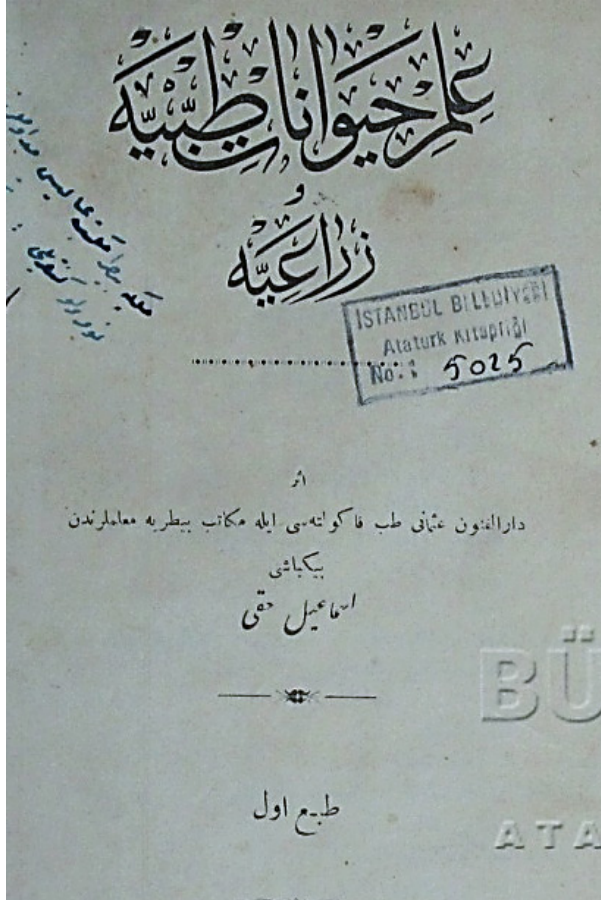


Figure 5: Cover page of İsmail Hakkı Bey's book titled *İlm-i Hayvanât-ı Tıbbiye ve Zirâiye*.

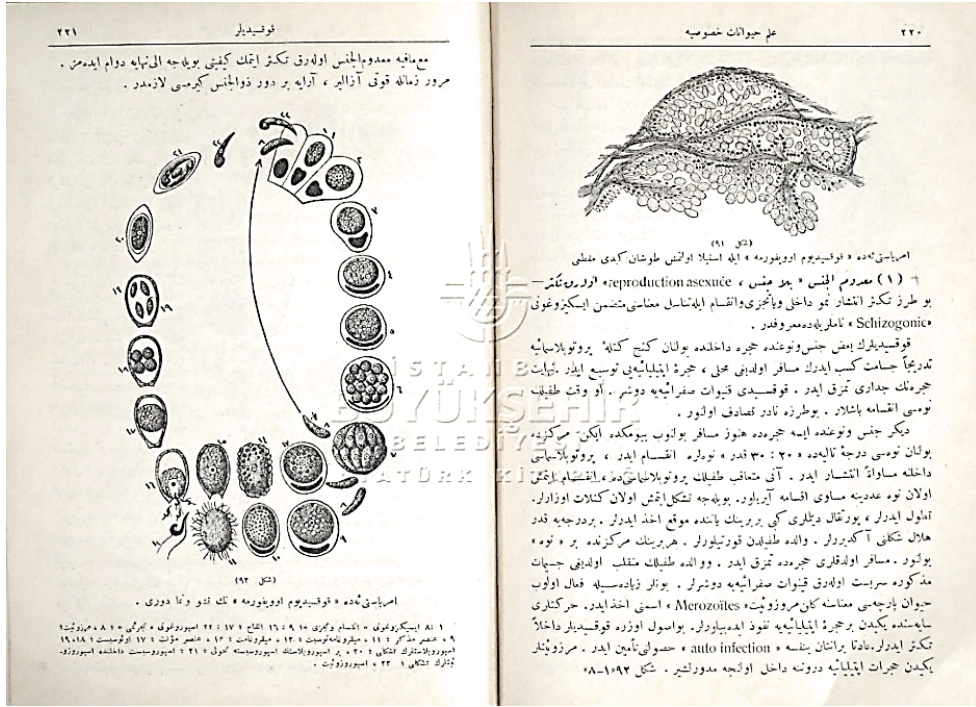


Figure 6: Pages 220 and 221 from İsmail Hakki's *İlm-i Hayvânât-ı Tıbbiye ve Zirâ'iye*.

Parazitenin Adı	Parazitenin Türü	Parazitenin Yaşamı	Parazitenin Tedavisi
1. Kızamık	Virüs	1. Kızamık	1. Kızamık
2. Kızamık	Virüs	2. Kızamık	2. Kızamık
3. Kızamık	Virüs	3. Kızamık	3. Kızamık
4. Kızamık	Virüs	4. Kızamık	4. Kızamık
5. Kızamık	Virüs	5. Kızamık	5. Kızamık
6. Kızamık	Virüs	6. Kızamık	6. Kızamık
7. Kızamık	Virüs	7. Kızamık	7. Kızamık
8. Kızamık	Virüs	8. Kızamık	8. Kızamık
9. Kızamık	Virüs	9. Kızamık	9. Kızamık
10. Kızamık	Virüs	10. Kızamık	10. Kızamık
11. Kızamık	Virüs	11. Kızamık	11. Kızamık
12. Kızamık	Virüs	12. Kızamık	12. Kızamık
13. Kızamık	Virüs	13. Kızamık	13. Kızamık
14. Kızamık	Virüs	14. Kızamık	14. Kızamık
15. Kızamık	Virüs	15. Kızamık	15. Kızamık
16. Kızamık	Virüs	16. Kızamık	16. Kızamık
17. Kızamık	Virüs	17. Kızamık	17. Kızamık
18. Kızamık	Virüs	18. Kızamık	18. Kızamık
19. Kızamık	Virüs	19. Kızamık	19. Kızamık
20. Kızamık	Virüs	20. Kızamık	20. Kızamık
21. Kızamık	Virüs	21. Kızamık	21. Kızamık
22. Kızamık	Virüs	22. Kızamık	22. Kızamık
23. Kızamık	Virüs	23. Kızamık	23. Kızamık
24. Kızamık	Virüs	24. Kızamık	24. Kızamık
25. Kızamık	Virüs	25. Kızamık	25. Kızamık
26. Kızamık	Virüs	26. Kızamık	26. Kızamık
27. Kızamık	Virüs	27. Kızamık	27. Kızamık
28. Kızamık	Virüs	28. Kızamık	28. Kızamık
29. Kızamık	Virüs	29. Kızamık	29. Kızamık
30. Kızamık	Virüs	30. Kızamık	30. Kızamık
31. Kızamık	Virüs	31. Kızamık	31. Kızamık
32. Kızamık	Virüs	32. Kızamık	32. Kızamık
33. Kızamık	Virüs	33. Kızamık	33. Kızamık
34. Kızamık	Virüs	34. Kızamık	34. Kızamık
35. Kızamık	Virüs	35. Kızamık	35. Kızamık
36. Kızamık	Virüs	36. Kızamık	36. Kızamık
37. Kızamık	Virüs	37. Kızamık	37. Kızamık
38. Kızamık	Virüs	38. Kızamık	38. Kızamık
39. Kızamık	Virüs	39. Kızamık	39. Kızamık
40. Kızamık	Virüs	40. Kızamık	40. Kızamık
41. Kızamık	Virüs	41. Kızamık	41. Kızamık
42. Kızamık	Virüs	42. Kızamık	42. Kızamık
43. Kızamık	Virüs	43. Kızamık	43. Kızamık
44. Kızamık	Virüs	44. Kızamık	44. Kızamık
45. Kızamık	Virüs	45. Kızamık	45. Kızamık
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Figure 7: A fold-out chart located at the end of İsmail Hakki's *İlm-i Hayvânât-ı Tıbbiye ve Zirâ'iye*, illustrating parasitic animals, along with their species and hosts.