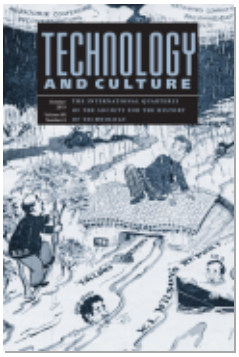
# Akarnan: The Stethoscope and Making of Modern Ayurveda, Bengal, c. 1894–1952

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SPECIAL ISSUE: NEW HISTORIES OF TECHNOLOGY IN SOUTH ASIA

# *Akarnan*

## The Stethoscope and Making of Modern Ayurveda, Bengal, c. 1894–1952

PROJIT BIHARI MUKHARJI

**ABSTRACT:** The histories of modern medical technologies have largely been studied exclusively within the biomedical context. Yet historians of medicine have increasingly demonstrated that a number of non-biomedical therapeutic traditions—Ayurvedic and Chinese medicine to name only two—have attained their own distinctive modernity. How has the incorporation of various medical technologies affected these neo-traditional medicines? What is the relationship between technologies and the body knowledge in non-biomedical therapeutics? Do shared technologies such as the stethoscope reveal the same bodily facts in biomedical and Ayurvedic contexts? These are some of the questions explored in this article by focusing on the uptake of the stethoscope in modern Ayurvedic medicine in Bengal. In the process the article also describes the emergence of a new sonic body in modern Ayurveda.

An oft-repeated dictum among Ayurvedic physicians (known in Bengal as "Kavirajes") was that diagnosis involved *darshan* (seeing), *sparshan* (touching), and *prashna* (questioning). The dictum is mentioned in Vagbhatta's *Ashtanga Hridayam*, one of the three texts held today to constitute the core canon of the Ayurvedic tradition. Yet in 1926 one of the most prominent Ayurvedic physicians of the day, Gananath Sen, dismissed it as inaccurate. Instead, drawing upon a relatively obscure textual precedent,

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Sen advocated a much more elaborate schema for examining the patient which would utilize each of the physician's senses. Foremost in Sen's description of these sensuous technologies was examination by "hearing" or "listening" (*srotra pariksha*).

By "listening" Sen did not mean listening to the patient's narrative. He clarified that this mode of examination was undertaken to detect "diseases of the chest" where *vayu* (wind) and *sleshma* (phlegm) together "produces sounds of bubbles etc."[1] In a separate commentary that Sen himself wrote on the text, he explained how this examination was to be undertaken in greater detail. He explained when and why the Kaviraj heard the sound of bubbles in the chest, when he heard the sound of a flute and when he heard the sound of flaps flapping. To hear these diagnostic sounds, however, Sen plainly stated that one had to use a *nadijantra* or stethoscope.[2]

It is this conspicuous use of the stethoscope in modern Ayurveda that I will explore in this article. Most histories of modern medical technologies tend to focus on biomedical uses.[3] I know of only three studies devoted to the incorporation of modern medical technologies into "traditional" therapeutics.[4] This is all the more perplexing since many historians and ethnographers have noted the widespread use of such technologies in passing. Practitioners of "traditional medicines" have been found using stethoscopes, for instance, in China, Nigeria, Thailand, Ghana, etc.[5] Elsewhere I have argued that the incorporation of such small technologies played a crucial role in modernizing the Ayurvedic medicine at the turn of the nineteenth and twentieth centuries.[6] The history of the stethoscope in modern Ayurveda, however, remains uncharted.

In this article, I hope to fill this gap in our knowledge by chronicling the history of the adoption of the stethoscope into modern Ayurveda. Through this history I also want to interrogate the new sonic image of the body enshrined in modern Ayurveda. Finally, I want to use this history of incorporation to refigure existing discussions of technology transfer.

1. Gananath Sen, Siddhanta Nidanam, 49.

2. Ibid., 50.

3. Stanley Joel Reiser, *Medicine and the Reign of Technology*; Carsten Timmermann and Julie Anderson, eds., *Devices and Designs*; Keith Wailoo, *Drawing Blood*; Margarete Sandelowski, *Devices & Desires*.

4. Tatiana Chudakova, "The Pulse in the Machine"; Servando Z. Hinojosa, "Bonesetting and Radiography"; Guy Attewell, "Alignments?"

5. Sean Hsiang-lin Lei, *Neither Donkey nor Horse*, 115; O. Y. Oyeneye, "Mobilizing Indigenous Resource"; Vichai Chokevivat and Anchalee Chuthaputti, "The Role of Thai Traditional Medicine"; Caroline Abel and Kofi Busia, "An Exploratory Ethnobotanical Study."

6. Projit Bihari Mukharji, *Doctoring Traditions*.

## Syncretism, Purism, and the Stethoscope

Unfortunately, tracing the history of the incorporation of small technologies such as the stethoscope into Ayurveda is nowhere as easy as might be anticipated.[7] Modern Ayurveda is a neo-traditional form of therapeutics.[8] Laurent Pordie, to whom we are beholden for the term "neo-traditionalism," writes that "neo-traditionalism could thus characterize a diversification of healers' activities and a multiplication of legitimating instances, their proximity to biomedicine on the practical, epistemological and symbolic planes, or the fact that they would be both subject to and participants in globalization (deterritorialization of actors and practices, modern transnationalization of knowledge) and that they would make systematic use of 'tradition' to legitimate new practices."[9] There is thus frequently a divergence in neo-traditional therapeutic traditions between a rhetoric of unalloyed traditionalism that smacks of stasis and great practical innovativeness that evidences tremendous dynamism. Thus, while ethnographers frequently document the voracious uptake of new technologies and tools in such therapeutic repertoires, historians, who are limited by the archive they have been left, often have difficulty finding traces of such innovation. It is therefore very important for historians to critically examine the marginal traces of such innovation and to evaluate the importance of such traces.

This is why Sen's account is so important. Though it is a rare instance of the stethoscope and its use being directly discussed in a modern Ayurvedic text, its importance cannot be underestimated, precisely because of who Sen was and the role he played in shaping modern Ayurveda. Sen was no obscure, minor figure. He was the first dean of the Ayurvedic faculty at the then newly founded Benares Hindu University. He twice served as the president of the *Akhil Bharatiya Ayurveda Mahasammelan* (All India Ayurveda Conference—the foremost Ayurvedic organization of its time): in 1911 and again in 1931. The British Indian government officially honored him with the title of "Mahamahopadhyaya" (literally: greatest amongst great teachers). His authority and the text, *Siddhanta Nidanam*, in which he discussed srotra pariksha, are central to the history of modern Ayurveda.

Despite his eminence, it might be objected that Sen represented a very particular trend within modern Ayurveda. Medical anthropologist Charles Leslie has described Sen as "perhaps the best-known advocate in the 1920s and the 1930s of an integrated medical system."[10] But on the issue of the stethoscope at least, Sen's opponents seemed to have been equally enthusiastic.

7. For a history of the invention of the stethoscope, see Jacalyn Duffin, *To See with a Better Eye*.

8. Laurent Pordié, "Tibetan Medicine Today."

9. Ibid.

10. Charles Leslie, "Interpretations of Illness," 183.

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Sen's main opponents, particularly in the pre-decolonization period, who advocated a "pure" or "unmixed" Ayurveda were Shyamadas Bachaspati and his son, Bimalananda Tarkatirtha. Neither Bachaspati nor Tarkatirtha, despite their enormous influence, wrote much. The closest we have to an exposition of this purist position emerges instead in a novel, *Arogya Niketan* (House of healing), written in 1952. The author of this critically acclaimed and nationally honored novel, Tarashankar Bandyopadhyaya, was a close friend and political compatriot of Tarkatirtha and based his novel on extensive conversations with the latter. The central character of the novel was the scion of a respected family of hereditary Kavirajes trying to deal with the growing presence and hegemony of biomedicine.[11]

In the novel, there is a key episode in which the young hero and an old biomedical doctor are reunited after a bitter falling-out. They had originally met when the young Kaviraj had apprenticed himself to the old biomedical doctor with a view to learning the new biomedical system. The apprentice, however, eventually left because he could not get himself to do dissections. Sometime later, the biomedical master came to gradually appreciate the moral scruples of his erstwhile student and respect the therapeutic value of the Ayurvedic system even if he could not see how it worked. It was then that an emotional rapprochement took place between the two. Soon after the rapprochement, the old biomedical doctor decided to retire from his practice and devote himself to studying the mysteries of life. At that moment, calling his old student, the young Kaviraj, to him he handed over one of his own stethoscopes. Yet he refused to give the young man his thermometer, saying, "You do not need that."[12]

Considering the location of the incident in the general narrative structure of the novel, it is clearly suggestive that the stethoscope, unlike the thermometer, was capable of complimenting the pre-existing skills of Ayurvedic diagnosis. This is borne out later in the novel when the Kaviraj, by then much older and experienced, is seen to be comparing the sounds he heard through the stethoscope with the beats he perceived through his Ayurvedic pulse-examination. In describing the two examinations, the author wrote that, "With a stethoscope he felt the heart's beats. Under the circumstances there was little chance of a sudden collapse. The synchronicity of the palpation of the pulse with the beating of the heart was just like a friendly concert—where an instrumentalist and his supporting musicians played in concert. Though the supporting [music] might occasionally be weak, it was never broken."[13]

Here it is worth noting that unlike the biomedical pulse, the Ayurvedic pulse is a qualitative one that reveals the movement and levels of *doshas* or para-humors. The biomedical pulse is, of course, more directly connected

11. Mukharji, *Doctoring Traditions*, 74–75.
12. Tarashankar Bandyopadhyay, *Arogya Niketan*, 129.
13. Ibid., 200.

to heartbeats and blood flow. The two types of data deriving from Ayurvedic pulse examination, *nadipariksha*, and stethoscopic examination of the heart are thus very distinctive types of data that refer to very different bodily processes and indeed, distinctive anatomies. Yet they are shown to be complimentary. Significantly, not identical. But still, complimentary.

That this text was produced in close consultation with one of the strongest opponents of Sen is even more significant. It demonstrates that it was not just syncretists such as Sen, but also purists such as Tarkatirtha, who accepted the compatibility of the stethoscope with older Ayurvedic practice.

It would be wrong to suggest that there was absolutely no opposition to the stethoscope within Ayurvedic circles. Most of the opponents, however, challenged what they perceived to be the futile pursuit of diagnostic precision at the cost of curative value, rather than frontally challenging the reliability of the stethoscope per se. One Ashutosh Gangopadhyay, writing in a journal called *Ayurveda Bikash* (Development of Ayurveda), in 1913 mocked, "Whenever I see a doctor put his stethoscope to someone's breast or his thermometer in someone's arm-pit, it looks like a large, glassy insect is preying upon another hapless insect."[14] Gangopadhyay went on to emphasize the need for prevention rather than cure, the importance of following traditional rules of health and the usefulness of many domestic remedies. His critique therefore seemed to be aimed mainly at the exaggerated claims made by physicians in general and biomedical men in particular, and the redundancy of diagnostic precision unless the physician can cure what he diagnosed. Another eminent Kaviraj, Sureshchandra Sen, elaborated a similar position during a meeting of the *Nikhil Bharatvarshiya Ayurveda Mahasammelan* (All India Ayurvedic Congress) in 1914. Sureshchandra argued that the ancient technique of pulse-diagnosis, nadipariksha, was much more reliable than the diagnosis based upon thermometers and stethoscopes. He said, "Often using a stethoscope it has been found that, a patient is suffering from *yakshma* (often translated as tuberculosis), [and] there is no hope of survival. On the other hand the Kaviraj based on a nadipariksha has declared that the patient does not have yakshma and indeed cured the patient with his medicines. And while it is true that one cannot determine pneumonia by a nadipariksha, many a patient whose lungs have been destroyed by pneumonia, have then been cured by Kavirajes."[15] None of these critics completely reject the stethoscope. In fact, even one as critical as Sureshchandra seems to suggest that at least for pneumonia, it is a valuable diagnostic tool. What they add is that these tools are not infallible and diagnostic precision must come second to actual curative value.

14. Ashutosh Gangopadhyay, "Deher Katha," 189.
15. Sureshchandra Sen, "Ayurbeder Punarutthaner Upaye Nirnay," 226.

## What's in a Name?

These discussions from the 1910s onwards suggest that despite differences of opinions, most Kavirajes had accepted some kind of role for the stethoscope. Yet, somewhat ironically many of them called the instrument by different names.



The earliest account of the stethoscope by a Kaviraj dates from 1894, when Kaviraj Nagendranath Sengupta discussed it in a textbook on Ayurvedic medicine. Nagendranath had called the device "stethoscope," though he called the examination performed by it *akarnan*, or "putting to the ear."[16] Kshirodproshad Bidyabinod, however, writing in 1910, described it as a *sabdamanadi jantra* (sound measurement, etc. machine).[17] In 1913, Ashutosh Gangopadhyay called it a "stethescope" rather than a stethoscope.[18] Sureshchandra Sen, in 1914, called it the *phusphus pariksha jantra* (machine for examining the lungs).[19] Gananath Sen in the mid-1920s called it a "nadijantra" (pulse machine), while he named the actual examination by the stethoscope "srotra pariksha" (examination by listening). Writing in 1950, Chakrapani Sharma, a Hindi-speaking Kaviraj based in Calcutta, used four names: "stethoscope," *akarnan-yantra*, *dhwani-vahak-yantra*, and *nadi-yantra*.[20] By 1952, however, we find Tarashankar referring to the instrument once more simply as the "stethoscope."

What does this confusing plethora of names for the instrument reveal? I would argue that in the absence of more in-depth discussions, even these names can reveal much about how the instrument was seen in Kaviraji circles. To begin with, of course, we notice both in 1894 and again in 1952 Kavirajes seemed satisfied to call the device by its English name. It was only roughly in the inter-war years that attempts were made to find vernacular names for it. This timing itself is important. This was the period when the first Ayurvedic colleges were being established. This was also a period of bitter factionalism within Ayurveda in Calcutta.[21] I would argue this context created a more pronounced need to constantly mark out Ayurveda's distance from biomedicine. This meant that even when the instrument itself was adopted into Kaviraji practice, its identity still had to be transformed and made consonant with that of Ayurveda and distinct from biomedicine.

Aside from such general anxieties, the variety of names also suggested possible differences in how early Kaviraj users conceptualized the actual functions of the instrument. Bidyabinod for instance wrote how the physician, "without asking questions, immediately became earnestly inquisitive

16. Nagendranath Sengupta, *Kaviraji Sikshya*, 25.
17. Kshirodproshad Bidyabinod, *Aloukik Rahasya*, 164.
18. Gangopadhyay, "Deher Katha."
19. S. Sen, "Ayurbeder Punarutthaner Upaye Nirnay."
20. Chakrapani Sharma, *Sannipat-jwar Chikitsa*, 16.
21. Mukharji, *Doctoring Traditions*, 39–40.

to locate the secret hiding place of that tremendous disease with the help of his sabdamanadi jantra. His eyes gradually closed as he became engrossed in his search. It felt as though that terrible and incurable disease had poked its finger into his eye from its secret hiding place somewhere deep inside its fortress guarded by the wall of ribs."[22] Hidden beneath the lyrical language is a clear idea that the stethoscope can hear sounds made deep within the chest and it allows the physician to determine the actual place where the disease is located. The stethoscope's operation is not limited to any particular organ in this case. The etiology of disease itself was a highly localist one: diseases were thought to be located in a specific part of the body. Notwithstanding the large number of popular publications that describe the Ayurvedic etiology as "humoral" and "holistic," in the Ayurvedic textual corpus disease was more about the displacement of the parahumors or doshas than their imbalance.[23] Therefore, Bidyabinod's understanding of the stethoscope as an instrument that localized disease within the body using sounds was perfectly compatible with established etiology.

By contrast, Sureshchandra Sen was clear that the device was exclusively used to examine the lungs. The name "phusphus pariksha jantra" left this particular function in no doubt whatsoever. His further statement that the instrument was mostly useful for the diagnosis of pneumonia served to confirm the nomenclature. A particular instrument that would be needed to diagnose diseases of a particular organ was utterly novel within the Ayurvedic etiology. By casting it as such, however, Sureshchandra was seeking to limit the instrument's importance. His entire effort was to acknowledge its utility but minimize its value. To that end claiming that it was useful, but only for a single organ, was one way to minimize its value.

Finally, in the redoubtable Gananath Sen's writings we find yet another name for the instrument. His name, "nadijantra," is at first curious because it makes no reference to sound, soundings, or the chest at all. Yet upon slight reflection, his choice becomes a telling one. On the one hand, by calling the instrument "nadijantra," or "pulse machine," he was elevating it to the level of the most respected diagnostic technique traditionally available to Kavirajes, i.e. pulse-examination or nadipariksha. His project is aimed at combatting precisely the kind of position taken by Sureshchandra when he elevated nadipariksha as eminently greater and better than the stethoscope. Sureshchandra had tapped into the long-standing faith in nadipariksha and argued that it was infallible, whereas the modern stethoscope was either fallible or at best limited to a single organ in its use. Gananath rejected Sureshchandra's opinion by equating the new instrument, nadijantra, to the old technology, nadipariksha. Gananath may also have intended the name as a hint connecting the "pulse" to heartbeats and blood circulation, something that was not explicit in premodern Ayurveda.

22. Bidyabinod, *Aloukik*, 164.
23. Mukharji, *Doctoring Traditions*, 146–48.

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Gananath is generally recognized as espousing a specific type of "syncretism" whereby much of modern biomedicine was actually already present in Ayurvedic writings.[24] His "syncretism" was in effect an act of recovery: the recovery of parts of Ayurveda that were once present but then somehow or other became lost. By choosing to call the stethoscope "nadi-jantra," he was therefore also representing a modern instrument as essentially a recovery of an old technique.

Chakrapani Sharma, notwithstanding his partial acceptance of the English name of the instrument, advanced a similar approach in the 1950s. He wrote that, "These days people make fun of Ayurvedists when they see them with the above-named instrument, what they do not know is that Ayurvedists have been using this instrument since the very inception of medicine."[25] This claim to antiquity of Ayurvedic stethoscopy was justified by the insertion of a Sanskrit reference to the *nadi-yantra*. The nadi-yantra mentioned in the classical texts, however, was most likely a surgical instrument of some sort and bore no direct relation to the modern stethoscope. Sharma thus added that, "This proof (i.e. the Sanskrit verse) proves that we had this instrument in (ancient) India. Its form then however, was not what it is now. Neither was there much use of it (back then)."[26]

Sharma also went on to emphasize that though the ancient Ayurvedists had not much used the stethoscope, the bodily insight they derived through purely "spiritual" (*adhyatmik*) vision was entirely compatible with the information that is revealed by the stethoscope. Since moderns lacked the spiritual vision of the ancients, he insisted that it was the duty (*kartavya*) of every contemporary Ayurvedist to learn to use this instrument.

## Akarnan

The smoothness with which the stethoscope entered the Kaviraji repertoire might in part have been due to the fact that it was not directly displacing any previously established diagnostic technique. Unlike other small instruments such as the pocket watch, which transformed pulse-examination, or the new chemical methods of urine-examination that displaced older methods of uroscopy, examination by stethoscope was a brand new diagnostic modality.

A locally popular Ayurvedic text, the *Prayog Chintamani* of Rammanikya Sen, possibly written in the seventeenth century and first published in print in 1889, gave a detailed guide to the prevalent methods of diagnoses followed by Bengali Kavirajes. Expectedly, the pride of place was reserved for *nadipariksha*, and this was discussed in great length and detail. Other diagnostic methods included *nasapariksha* (examination of nostrils),

24. Leslie, "Interpretations of Illness."
25. Sharma, *Sannipat-jwar Chikitsa*, 16.
26. Ibid.

*netrapariksha* (examination of eyes), *mutrapariksha* (urine examination), *jiuhvapariksha* (examination of the tongue), *asyapariksha* (examination of the patient's ability to taste different flavors), *bastrapariksha* (examination of the patient's clothes), and finally, for women, an additional *artabpariksha* (examination of menses). Besides these, there was also some techniques of medical astrology which pertained to when the patient's agent (*doot*) brought news of the illness to the Kaviraj, which direction he came from, etc.[27] The skilled Kaviraj had to deploy multiple senses in these examinations. The nadipariksha required a subtle and well-trained sense of touch, the netrapariksha necessitated a clear and trained vision, and the bastrapariksha was mainly dependent on the Kaviraj's sense of smell. The medical astrology also required some basic mathematics. Yet none of it required hearing or sound.

Another hugely popular local eighteenth-century text, *Bhaisajyaratnabali*, similarly stated that "darshan (seeing), sparshan (touching) and prashna (questioning) are the three ways to know a disease. That is to say, the disease can be known by seeing the urine (mutra) and the tongue (*jihva*) etc., by touching the "pulse" (*nadi*) and the skin (*twak*) etc., and, by questioning the patient and his agent about the disease."[28] Once again, there is an absence of any use of listening other than in the form of interrogation of the patient and her agent. There is, in short, no assigned traditional role for the sense of hearing that was in conflict with the stethoscope.

This was significantly different from the biomedical or, more generally, Western therapeutic tradition. The distinction is captured in the very myths that frame the invention of the stethoscope in Paris. Tsung O. Chen has written on the fairly extensive medical folklore that has developed surrounding how and why Rene Theophile Hyacinthe Laennec invented the stethoscope. One of the most remarkable things in this body of lore, from our present perspective, is the way Laennec's discovery is connected to preexisting modes of auditory diagnosis. Thus, in one account Laennec was inspired to invent the instrument after he found it difficult to put his ear to the chest of a rather obese young woman. In another version of the story, propriety and embarrassment forbade the young doctor from placing his ear on the bosom of a young lady patient, driving him to invent the instrument. A third version speaks of Laennec trying to avoid the contagion of a consumptive patient by not putting his ear to the patient's breast.[29] Notwithstanding their variety, in all of these accounts there is clear recognition of a preexisting diagnostic regime that necessitated sonic examination of the chest. Laennec's discovery is seen to merely be upgrading or improving upon that technique.

Historians have backed up this folklore. P. R. Fleming's *Short History*

27. Rammanikya Sen, *Prayog Chintamani*.
28. Gobinda Das, *Bhaisajyaratnabali*, 7.
29. Tsung O. Cheng, "How Laënnec Invented the Stethoscope."

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*of Cardiology* mentions, for instance, that "auscultation of the chest by the unaided ear was practiced for centuries before the invention of the stethoscope."[30] Fleming goes on to point out that while the "pleural friction" and the "succussion splash" were already mentioned in the Hippocratic corpus, it was only in the sixteenth century that heart sounds had first been heard by Peter Forest, first professor of medicine at the University of Leyden. Later, William Harvey and Robert Hooke also mentioned heart sounds. It was Hooke who suggested using these sounds for diagnostic purposes. In the early nineteenth century, "immediate auscultation of the heart and lungs," meaning the practice of a physician directly applying his ear to the patient's chest to listen to the heart and lungs, was still "practiced occasionally, and not abandoned for many years."[31]

The absence of such a long tradition of auscultation in Ayurvedic medicine in Bengal had two immediate consequences for the uptake of the stethoscope. First, there was very little anxiety about the quality of mediation of sound that the new instrument produced. In 1887 E. Darwin Hudson, Professor of General Medicine and Diseases of the Chest at the New York Polyclinic, mentioned the following possible objections to the use of the stethoscope:

1. The interposition of the stethoscope may intensify and other wise modify and change sounds.
2. The training of the ear is liable to be neglected, and confidence in its interpretations lessened.
3. Too habitual use of the stethoscope, with its intensification of sounds, in clinical teaching and practice, may positively impair the previous delicacy of the ear for sounds of normal intensity.[32]

Such objections stemmed from a preexisting set of skills and techniques in the Western physician's repertoire and a long tradition of familiarity with thoracic sounds. Each of these three objections is clearly rooted in the anxiety that instrumentation would lead to a loss of skills on the part of the physician. Hudson sought to assuage this fear by emphasizing that one had to combine the use of the stethoscope with the more traditional immediate auscultation directly by the ear.[33]

This long tradition of auscultation also meant that a complex and highly nuanced framework had developed in Western medicine for conceptualizing and categorizing bodily sounds. Chest acoustics, by the end of the nineteenth century, had become a highly technical subject in Western and biomedical writings. The duration, intensity, rhythm, pitch, etc. were

30. Peter Robert Fleming, *A Short History of Cardiology*, 87.
31. Ibid.
32. Erasmus Darwin Hudson, *A Manual of the Physical Diagnosis of Thoracic Diseases*, 38.
33. Ibid.

all discussed and classified. As a result, a complex and specialized lexicon of sounds had developed, with sounds named, for example, "rales," "ronchi," and "crepitant."[34]

Kavirajes, on the other hand, had to build up an Ayurvedic chest acoustics almost from scratch. As a result, much of the complexity was lost and the anxiety about losing earlier skills of listening was never discussed. Nagendranath Sengupta's *Kaviraji Sikshya*, which in 1894 first discussed the instrument at length, was remarkable in the conspicuousness and extent of its borrowings from Western writings on the stethoscope. Nagendranath described akarnan as the "examination of the various chest sounds through the application of the sense of hearing."[35] He went on to explain that akarnan could be either immediate (*pratyaksha*) or mediate (*paraksha*), and then further classified breathing sounds into three types: tracheal, bronchial, and pulmonary, or vesicular. The names of the three latter categories were simply transliterated from English, and no attempt was made to assign them Bengali or Sanskrit names. This in itself made them and the entire section on the stethoscope stand out as being clearly borrowed. In describing the sounds in each of the three categories, Nagendranath opted for simple descriptions and avoided naming the sounds.[36]

By 1950, however, the hesitancy and conspicuous foreignness of the new sonic Ayurvedic body had disappeared. Sharma was much more forthright in giving detailed descriptions and Sanskritized names for the many types of bodily sounds he described. He named and classified a wide and diverse range of bodily sounds such as *Vayukoshiya-naad*, or "vesicular sound," and *Naaliya-dhwani*, or "bronchiorespiatior [sic]."[37] The latter, in turn, was divided further into *Vansivat-dhwani* (tubular), *Bibar-dhwani* (cavernous), and so on, while the *Vayukoshiya-naad* was sub-divided into *Karkash-dhwani*, *Teevra-dhwani*, etc. Besides, there were also sonic objects engendered in particular types of clinical examinations, such as *Shabd-dhwani*, which was the sound heard by the stethoscope placed on the chest when the patient was asked to count numbers from one.[38]

## A Different Audile Technique

In his fascinating account of our audible past, Jonathan Sterne has described what he calls the development of an audile technique through the history of the stethoscope.[39] Sterne points out that while much has been written about the epistemic shift engendered in the new "medical gaze," in

34. Ibid., 50–76.
35. Sengupta, *Kaviraji Sikshya*, 25.
36. Ibid., 25–27.
37. Sharma, *Sannipat-jwar Chikitsa*, 19–20.
38. Ibid., 21.
39. Jonathan Sterne. *The Audible Past*, 87–136.

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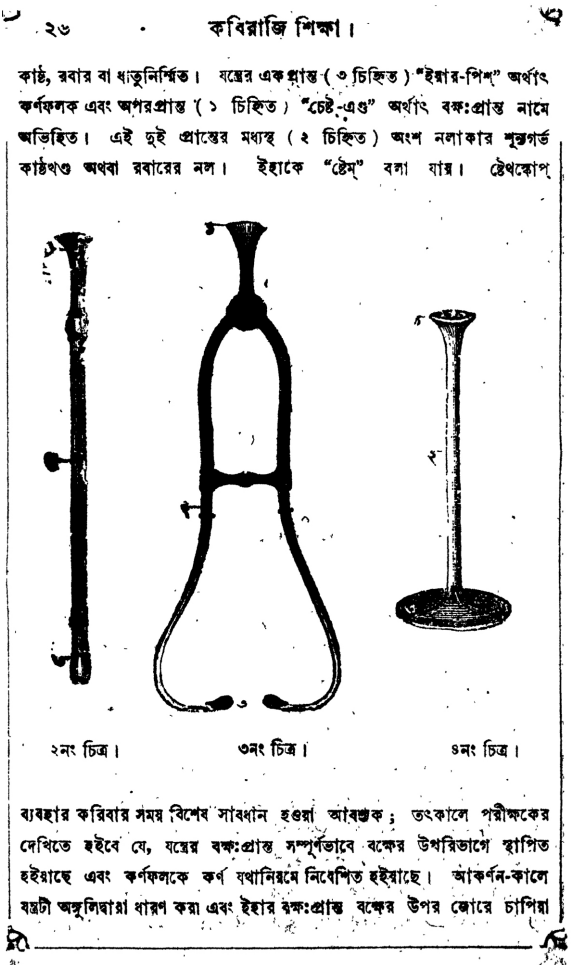
the Western therapeutic tradition this gaze was often premised upon hearing. But through the work of Laennec and others, this medical listening was organized, classified, and linked to a whole series of nineteenth-century developments that gave listening itself a much more practical and immediately purposive orientation.

"Speaking generally," writes Sterne, "audile technique articulated listening and the ear to logic, analytic thought, industry, professionalism, capitalism, individualism, and mastery—even as it required a good deal of guesswork in practice."[40] The new Kaviraji enthusiasm for the stethoscope at one level did much the same. It relocated the ear amidst a new network of commodities, bodily habits, and social logics while creating a new, practical orientation towards the patient's bodily sounds. Yet there were crucial differences. By the time Nagendranath's pioneering discussion of the stethoscope for Kavirajes appeared in the 1890s, the original instrument had already undergone over half a century of design improvements. One of the most conspicuous changes since Laennec's original design was the development of the binaural stethoscope. Alfred Leared developed the basic design for the binaural stethoscope in 1851; by 1855 George Cammann's binaural stethoscope had become a commercially viable product.[41] Sterne calls the binaural stethoscope the embodiment of the trend toward abstraction and framing of sounds.[42] Further improvements, however, continued to be made. In 1886, for instance, advertisements in the *Lancet* informed readers that one Dr. Spencer had produced a better design.[43]

Remarkably, these improvements evinced little interest amongst the Kaviraji authors. Nagendranath bypassed the entire issue of design alternatives by merely saying, "stethoscopes are of many types, here I will say a few words about the type more commonly in use."[44] Later again, he wrote that, "These days stethoscopes with two rubber tubes have become popular. Instead of attending to the orderliness and glory of the instrument, one should pay closer attention to the act of akarnan."[45] Nagendranath also mentioned that stethoscopes made from wood, rubber, and metal were all available and refused to state a preference among them. Interestingly, though Sharma developed Nagendranath's early innovations more fully, he also evinced absolutely no interest in discussing the relative merits of different types of stethoscopes or even acknowledging that the choice of the instrument might matter. The lack of interest in the design of the instrument itself seems to have thus remained largely unchanged over almost half a century (fig. 1).

40. Ibid., 95
41. Ibid., 112.
42. Ibid., 111.
43. Anon., "Dr. Spencer's Improved Binaural Stethoscope"
44. Sengupta, *Kaviraji Sikshya*, 25.
45. Ibid., 27.


২৬ কবিরাজি শিক্ষা।

কাষ্ঠ, রবার বা ধাতুনির্ম্মিত। যন্ত্রের এক প্রান্ত (৩ চিহ্নিত) "ইয়ার-পিশ্" অর্থাৎ কর্ণফলক এবং অপরপ্রান্ত (১ চিহ্নিত) "চেষ্ট-এণ্ড" অর্থাৎ বক্ষঃপ্রান্ত নামে অভিহিত। এই দুই প্রান্তের মধ্যস্থ (২ চিহ্নিত) অংশ নলাকার শূন্যগর্ভ কাষ্ঠখণ্ড অথবা রবারের নল। ইহাকে "ষ্টেম্" বলা যায়। ষ্টেথস্কোপ্

২নং চিত্র। ৩নং চিত্র। ৪নং চিত্র।

ব্যবহার করিবার সময় বিশেষ সাবধান হওয়া আবশ্যক; তৎকালে পরীক্ষকের দেখিতে হইবে যে, যন্ত্রের বক্ষঃপ্রান্ত সম্পূর্ণভাবে বক্ষের উপরিভাগে স্থাপিত হইয়াছে এবং কর্ণফলকে কর্ণ যথানিয়মে নিবেশিত হইয়াছে। আকর্ণন-কালে যন্ত্রটী অঙ্গুলিদ্বারা ধারণ করা এবং ইহার বক্ষঃপ্রান্ত বক্ষের উপর জোরে চাপিয়া

**FIG. 1** Stethoscopes in Nagendranath Sengupta's *Kaviraji Sikshya* (1930), p. 26, in author's collection.

Nagendranath's admonition—that Kavirajes ought to pay greater attention to the actual act of listening than to the niceties of the instrument—dismissed, on the one hand, any serious discussion of the instrumental mediation. But it also drew attention to the potential that the stethoscope opened up for Kavirajes for ostentation and physical display. Advertisements of Bathgate & Co., one of the leading pharmacists in Calcutta, give a fair sense of the market for stethoscopes in British India at the time. Amongst the instruments they offered for sale were six different types of stethoscopes: Shell-mounted Stethoscope, Cedar Stethoscope, Ebony Stethoscope, Arnold's Flexible Stethoscope, Binaural Stethoscope with Single Chest Piece, and finally, the Binaural Stethoscope with Double

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Chest Piece.[46] Some of the varieties seemed be distinguished more by their aesthetic appeal than their practical superiority, for instance the Shell-mounted and the Cedar varieties, while others had patently operational differences between them, such as Arnold's Flexible and the Binaural Double Chest Piece. Clearly, a culture of ostentation, fanned by a thriving medical commodity market, and a culture of precision, manifested in constant design innovations, blended into each other in these advertisements. Since many Kavirajes whom urban authors such as Nagendranath aspired to influence were frequently poor, especially the rural majority, such ostentation was well beyond their reach. Therefore, instead of persisting with it, authors like Nagendranath simply side-stepped the issue of the relative merits of different types of instruments. Sharma once more seemed to follow exactly in the footsteps of Nagendranath. While emphasizing the duty of Kavirajes to learn to use the instrument, he also criticized biomedical doctors for having turned the instrument into an ornament (*abhushan*).[47]

Despite the tone of austerity and the possibly genuine austerity necessitated by the relatively humble means of many rural Kavirajes, the actual acquisition of technological objects had social benefits. The consumption of technological objects was one of the most conspicuous means by which middle-class identity was articulated. Elsewhere I have argued that consuming small technologies was a key modality through which late nineteenth-century Bengali Kavirajes enacted their bourgeois modern identities.[48] The uptake of the stethoscope follows the same pattern of performing class identity through the consumption of technologies.

One consequence of this, however, was that it further reified the instrument itself by refusing to discuss the quality and extent of its mediation. "The forgetting associated with technology," says Sterne, "was the forgetting that all learners do as they achieve mastery—technique moves from a conscious effort to a kind of second nature, a disposition, a feel for the game."[49] Nagendranath, and those writing in his wake, sought to keep this second nature as simple as they could. They wanted to adopt the stethoscope, but guard against its becoming a divisive social symbol within the professional body of Kavirajes.

Nagendranath was more forthright in advising Kavirajes of how to exactly hold the instrument and what precautions to take. Here the author described the actual angle at which to hold the instrument, the posture of the fingers and arms, how and where to place the chest piece, and so forth. Sharma, writing decades later, still insisted that learning to handle the instrument was a complex and crucial task that could take up to two years to complete.[50] He too gave detailed instructions on, for example, how to

46. Bathgate & Co., *Pioneer*.
47. Sharma, *Sannipat-jwar Chikitsa*, 16.
48. Mukharji, *Doctoring Traditions*, 62–67.
49. Sterne, *The Audible Past*, 113.
50. Sharma, *Sannipat-jwar Chikitsa*, 17.

hold the instrument and where to place it.[51] Aside from such practical advice, the author also mentioned how thoracic sounds differed between men, women, children, and the aged. Absent, however, from the writings of the Ayurvedic authors is any evidence of the kind of disgust Sterne describes as animating nineteenth-century European physicians toward their socially inferior patients. Thus, technological mediation of auscultation in modern Ayurveda did not acquire the explicit role in augmenting the social distance between the patient and the physicians.

But whereas the overt ambition for social distance was absent in Kaviraji writing, the emphatic gendering of bodily sounds was absent from much of the biomedical writing. Nagendranath insisted that, though both men's and women's bodily sounds varied with age, in women they were always of a higher pitch and seemed to "jerk." This stronger sexual dimorphism was clearly resonant with Ayurvedic diagnostic techniques where, for example, the pulses of men and women needed to be examined on different wrists. By the end of the early 1950s. Sharma was much less explicit about the gendered nature of the sounds. He did, however, state that the relative power or weakness of the three key *nadis—Ida*, *Sushumna*, and *Pingala*—varied the sounds heard by the stethoscope.[52] This in turn may, in practice, have meant gendering of bodily sounds. But it is still noteworthy that Sharma did not explicitly gender the sonic body the way Nagendranath had done.

The audile technique which linked particular types of instruments, new bodily dispositions, embodied skills, etc. to produce a new practical orientation toward medical sounds can be seen developing in Ayurvedic medicine around the same time as in Europe. Yet the technique is also distinctive. Its lack of concern for the design improvements that further abstracted and framed bodily sounds sat next to a greater emphasis on being able to hear the bodily sounds of men and women differently. Likewise, politics of colonial middle class-ness was awkwardly orthogonal to the social disgust between middle-class patient and the physician.

## Sonic Lungs

The most conspicuous component of the distinctive audile technique of the Kaviraji Akarnan was the transplantation of the sonic lung in a modern Ayurvedic body. As noted above, Kavirajes across ideological divides had come to accept the stethoscope as having some utility in diagnosing pneumonia. Interestingly, whereas in biomedical circles thoracic auscultation was related to cardiac and respiratory health, in Kaviraji circles there was no significant cardiac component to the discussions around the stethoscope

51. Ibid., 25–26.
52. Ibid., 25.

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until the 1950s. Moreover, even in the 1950s, the anatomical description of the heart located it within the lungs rather than independent of them.[53] As we have seen, Nagendranath Sengupta's pioneering discussion focused only on respiratory sounds. Later, even critics like Sureshchandra Sen emphasized the value of the instrument for pulmonary diagnoses. Finally, Gananath Sen again connected the stethoscope to the diagnosis of pneumonia but made no mention of cardiac sounds. The stethoscope in Kaviraji circles therefore came to be firmly attached to the lungs.

This kind of single-organ-related diagnostic tools themselves were novel. Ayurvedic medicine had always treated the patient's health as a whole. Even if it defined disease as anatomically localized, none of the diagnostic tools were attached to any specific organ or tissue within the body. The effect of the stethoscope within the Ayurvedic repertoire was therefore unique.

Even more interestingly, the lungs themselves had a somewhat checkered history within the Ayurvedic anatomical imagination. In premodern Ayurvedic writing, the two lungs were usually given separate names. Thus the right lung was either called *kloman* or *tila*, while left lung was called *pupphusa*. Dominik Wujastyk, commenting upon treatment of the lungs by fourteenth-century author Sarangadhar and his slightly later commentator, Adhamalla, points out that "it is not clear from the texts either that their identity [i.e. kloman and pupphusa] was recognized, or that their involvement in respiration was understood."[54] The German Orientalist scholar Reinhold F. G. Mueller also suspected that the older corpus of Ayurvedic writings did not understand the lungs in the same way as modern biomedical anatomists.[55] Sarangadhar, for instance, described the internal location and the function of the lungs thus: "On the left side of the body are the lung and spleen; on the right is the liver. Experts say that the lung is the receptacle for the wind of the up-breath. The wise recognize the spleen as the root of the ducts which transport the blood. The liver is the site of blood-choler, as well as the receptacle of blood. The right lung (tila) is the root of the ducts which transport water, and it covers up thirst."[56] Adhamalla asserted that the kloman or tila, situated on the right side of the body, was close to the liver and the "source of secretion of blood."[57]

One of the first attempts to reconcile this distinctive Ayurvedic figuration of the lungs with the Western medical tradition's view of these organs was made by Binodlal Sen in 1887. Born into an illustrious family of Kavirajes, Binodlal was one of the first to attempt to align Ayurvedic and western medical ideas. In a two-volume textbook entitled *Ayurveda Bigyan*

53. Sharma, *Sannipat-jwar*, 25.
54. Dominik Wujastyk, ed., *The Roots of Ayurveda*, 320.
55. Reinhold F. G. Müller, "Kannten die altindischen Ärzte die Lunge?"
56. Wujastyk, *The Roots*, 324–25.
57. Ibid., 325.

(The science of Ayurveda), he included a subsection on chest examination under the section dealing with diagnostic techniques. Though Binodlal did not mention the stethoscope, his entire discussion of chest examination was based on auscultation and percussion. To explain these techniques, however, he also had to describe the Western view of blood circulation and respiration. Binodlal wrote, "By chest examination the examination of both the lungs (*phusphusa*) and the heart (*hritpinda*) must be understood. Air is constantly entering the lungs and purifying the blood therein. This air is known as *pran-vayu*. Later, having attracted the poisonous substance from it *udan-vayu* is exhaled out. This entrance and emission of vayu might be termed the respiratory process."[58]

Before going further, it is worth underlining Binodlal's conceptual translation in creating this image of respiration. According to Ayurvedic theory, vayu is one of the three fundamental para-humors. In most texts it is further divided into five sub-types, each of which have their own specific location and function. In some cases, there are said to be ten, rather than five, sub-types of vayu. Pran-vayu and Udan-vayu, however, are two of the most prominent sub-types and are found in nearly all Ayurvedic texts. The sixteenth-century Ayurvedic classic *Bhavaprakash* defined these two vayu sub-types as follows: "When the Udan-vayu moves upwards it makes the person talk a lot and creates an inclination to sing. If vexed/ vitiated, the same Udan-vayu gives rise to disease above the collarbone. The bodily vayu called pran-vayu upon going to the mouth makes rice/ food enter into the body and it clings to all life. Upon being vexed/vitiated it produces hiccups and breathing trouble/ asthma."[59] Clearly, pran-vayu and udan-vayu were not the simple inhaled and exhaled air that Binodlal sought to refigure them into being.

Elsewhere in the same book, Binodlal sought to reconcile the apparent contradiction by stating that since udan-vayu was the air that was exhaled, it was through this people were able to perform such actions as speaking and singing. Similarly, he stated that pran-vayu being the inhaled air provides the power (*shakti*) for moving food from the mouth through the alimentary tract to the stomach.[60] Such clarifications fail to paper over the way Binodlal transformed qualitatively different types of bodily air that were invested with what at least superficially looked like forms of moral and intentional agency into a purely secularized, quotidian air whose agency was limited merely to the instrumental provision of mechanical force.

In Binodlal's account, just as the two types of vayu were shorn of their enigmatic powers and reduced to mere air, the lungs too lost their distinctive Ayurvedic character and were rendered as mere mechanical air pumps. Thus he wrote further that, "Upon tapping a healthy person's

58. Binodlal Sen, *Ayurveda Bigyan*, 202.
59. Bhava Misra, *Bhavaprakash*, 32.
60. B. Sen, *Ayurveda Bigyan*, 115.

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lungs, the sound emitted is akin to the very clear sound that emitted by an empty vessel that has been struck. If a part of the lungs is devoid of air upon hitting that part a muffled, bad or blunt sound arises. Finally, in wasting cough and similar diseases, the lungs emit a worse sound."[61] In a similar vein, Binodlal continued slightly later that upon directly applying the Kaviraj's ear to the patient's chest, a range of sounds could be heard. "Sounds created by the regular entrance of air into the lungs and its exit again can be constantly heard. At the neck such sounds are deep and sharp. Sounds like a snake's breath or a flute signal the distortion of the lungs. If the lungs are choked by phlegm, blood or pus, the sounds are like the bubbles arising in a dirty and dank little village pond."[62]

The nature of the vayu types is also clarified by noting the late nineteenth-century Bengali translations of earlier Sanskrit works. Russicklal Gupta's *Bhavaprakash*, for instance, clearly describes the functional actions of these vayus as "their endeavor" (*chestha*). Illness, by contrast, is said to arise when these vayus are "angry" (*kruddha*).[63] While terms such as "chestha" and "kruddha" had greater polysemy in earlier Sanskrit usage, their Bengali translations at the end of the nineteenth century clearly clarify that the nature of agency attributed to these vayus by practicing Kavirajes such as Gupta, who were also contemporaries of Binodlal, was a sort of intentional agency—one capable of endeavoring and becoming angry. It also points once again to the mutual distinctiveness of the different sub-types of vayu which respectively "endeavored" toward different ends.

Binodlal sought to change all that. Both the mundane, everyday metaphors and the general descriptions rendered the internal physiological airs or breaths indistinguishable from a more generalized idea of air while also rendering the lungs as mechanical air pumps that broke with the earlier tradition of descriptions in Ayurveda. The specificity of the physiological vayus was lost. These crucial moves laid the groundwork for the stethoscope to be admitted into the Ayurvedic milieu. Thus it came as little surprise that Nagendranath, the youngest brother of Binodlal, undertook the first extensive discussion of the instrument.

Nagendranath's detailed description emphasized practical elements like how to hold the stethoscope and what kind of sounds to listen for, but he avoided exploring the physiology of respiration in greater detail. Unlike his brother, he also entirely eschewed any attempt in this section to introduce the older terminology of different types of vayu. Instead, he kept referring to the airs heard through the stethoscope simply as inhalation (*swas*) and exhalation (*praswas*).[64]

In the early work of these two innovative brothers one can see the gradual emergence of a conception of a respiratory process organized around

61. Ibid., 203.
62. Ibid.
63. Misra, *Bhavaprakash*, 33.
64. Sengupta, *Kaviraji Sikshya*, 25–27.

the lungs as a single organ. This is uneasily overlaid onto an older physiological imagination that recognizes a variety of intentionally agential physiological airs and occasionally sees the two lungs as independent entities. It is this new, overlaid physiology that continues to operate through the later decades, becoming more and more entrenched.

By the mid-1920s, when Gananath Sen wrote his textbook, the lungs and the attendant understanding of respiration had become quite well established. He thus used it to create a new Ayurvedic designation for pneumonia. Classical Ayurveda had recognized a class of fevers known as *Agantu-jwara* that were caused by external agents. Traditionally, this category was meant to include malignant spirits and such. Gananath, however, refigured this category as fevers caused by microorganisms. He then added a whole range of novel fevers ranging from typhoid to plague and influenza. For each of these new fevers, he either found a relatively obscure traditional name or simply coined a new one.[65]

In the case of pneumonia, he coined the name *Swasanaka-jwara*. Explaining the nomenclature, he said that it was so named because it involved the "organs of *Swasana* (respiration)."[66]

Interestingly, as we have seen, the organs of respiration were not in themselves novel entities in modern Ayurveda, and hence Gananath had defined them only slightly earlier in the text while describing yet another novel fever, *Slesmaka-jwara* (Influenza). There he explained how Slesmaka-jwara spread from person to person through respiration (*swasanadi nimittatah*) and how it effected the respiratory tract (*swasamarga*).[67] A commentarial gloss by the author himself further explained that "respiratory organs are the *swasapatha* (trachea) and two *puppusa* (lungs)."[68] This explanation, afforded only a few pages before the discussion on Swasanaka-jwara, confirmed the novelty of the organs of respiration and the fact that the author himself recognized that such an entity needed a gloss and might not be intelligible to many Kaviraj readers.

Calcutta in the 1930s had one of the highest rates of incidence of pneumonia and the influenza epidemic of the 1918 was still fresh in people's minds.[69] Both diseases were therefore highly visible in the local environment and had been described by biomedical authorities as respiratory diseases. Hence, developing an Ayurvedic discussion on respiration that could encompass these new diseases was an urgent necessity. Gananath achieved this, but he was helped in his endeavor by the preexisting work of Binodlal and Nagendranath.

65. G. Sen, *Siddhanta Nidanam*, 65–66.
66. Ibid., 79.
67. Ibid., 74.
68. Ibid., 75.
69. On pneumonia, see Benjamin White, Elliott Stirling Robinson, and Laverne Almon Barnes, *The Biology of Pneumococcus*, 288. On influenza, see Warren Taylor Vaughan, *Influenza*, 204.

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Naturally, in Gananath's discussion of Swasanaka-jwara, the stethoscope played a major role in diagnosis. He mentioned that the base of the lungs becomes solid, and that this leads to not hearing sounds via the stethoscope. He also mentioned the moist sound during breathing and explained it in terms of the accumulation of fluid in the lungs.[70] It was through the sounds of the stethoscope that the lungs became objectified, and new diseases localized in them, such as pneumonia. It is ironic that Gananath was instrumental in stabilizing this localization at precisely the moment when he was also reinterpreting the para-humors (doshas) as hormones and through it attempting to consolidate a more hydraulically unified Ayurvedic body.[71]

In Sharma's hands the lungs became even more conspicuous. In his detailed expositions on the sonic Ayurvedic body and its clinical examination, the lungs finally acquired an unprecedented concrete and discrete reality. In describing the *Vansivat-dhwani*, or "Tubular sound," for instance, Sharma wrote that "in difficult to cure cases (*kashtsadhya*) of pneumonia and yakshma when a connection is established (*sambandh ho jane par*) between a part of the lungs (*phusphusiya khand*) and subtle respiratory tube (*sukshma swasnalika*), a flute-like sound is emitted."[72] Similarly, in discussing the *Karkash* variety of *Vayukoshiya-naad*, he wrote, "According to the *Shastras* (scriptural authorities), a harsh sound (karkash-dhwani) is emitted from the upper part of the right lung. But if there is something wrong such harsh sounds are emitted from other parts as well."[73] In the context of Teevra-dhwani, he wrote that "when the lungs become hardened (*phephde me kathorta ane par*) both the inhalation and the exhalation become quick."[74] Clearly, these clinical directions materialized the lungs in a new way. And while there were some lingering marks of the older understanding of these structures, evinced in comments on the natural harshness of sounds emitted from the top of the right lung, the overall picture of their functioning was utterly unprecedented in Ayurveda.

Writing in a purely biomedical context, Annemarie Mol has argued that the medical body is not a single, unified entity, but rather a "body multiple" that is variously accessed and enacted through specific networks of expertise, technology, and materiality.[75] It is this multiplicity that must be kept in mind whilst interrogating the interactions between distinct traditions of anatomical imagination.

70. G. Sen, *Siddhanta Nidanam*, 79.
71. Mukharji, *Doctoring Traditions*, 191–226.
72. Sharma, *Sannipat-jwar Chikitsa*, 20.
73. Ibid.,16.
74. Ibid.,16.
75. Annemarie Mol, *The Body Multiple*.

## Braided Knowledge & the Audile Physiogram

The transplantation of the sonic lung into the modern Ayurvedic body may have displaced older notion of the autonomy of kloman and the pupphusa, but it did remain entirely unaffected by the larger bodily economy into which it was now placed. Nagendranath's early discussion of the lungs in relation to pneumonia had, for instance, mentioned that the affected lungs might begin to rot. The stage of rottenness could then be discerned by the putrid smell of the sputum.[76] Clearly a lung that could rot away owing to pneumonia was not the familiar biomedical lung. Gananath's discussion of pneumonia gives us further clues to the development of the transplanted sonic lung within the modern Ayurvedic body.

Having laid out the basic description of *Swasanaka-jwar* and how to diagnose it using a stethoscope, Gananath proceeded to explain its etiology and pathogenesis. He explained in detail how people acquired pneumonia. Though the primary cause was *jivanu-visha* (poisons produced by germs), he insisted that it particularly affected those who were weak and did not cover their bodies with thick coverings as well as those who were "timid and of poor mind." Amongst other causes Gananath listed were exposure to a lot of cold and rain, injury, "inhaling putrid smell for long periods," staying close to an affected person, and staying in places that are cold throughout the year, particularly in the winter months.[77] Clearly this is not an entirely biomedical description of the cause of pneumonia. The emphasis on mental states, the effect of foul smells, etc., was not part of the mid-1920s biomedical etiology of pneumonia.[78]

Furthermore, in describing the actual pathogenesis within the body, Gananath wrote that, "doshas getting aggravated by *visha* (poisons) invade the organs of respiration." Its effect, he clarified, was particularly upon the puppusa, either the "one or both."[79] Clearly the doshas or para-humors were not part of the biomedical etiology. Thus, while he had refigured the puppusa to bring it more in line with the biomedical imagination of the lungs, he had then allowed the doshas to be capable of "invading" the lungs.

Precisely what the doshas are is a matter of ceaseless debate. Some older scholars called them humors, but others in the late nineteenth century sought to read them variously as electromagnetic forces, and Gananath himself wanted to translate them as hormones.[80] What I would like to underline is that the doshas have had many different translations and continue to be translated in distinctive ways. This constant reinvention imparts to them a certain instability while also embedding it as a polysemic

76. Sengupta, *Kaviraji Sikshya*, 39.
77. G. Sen, *Siddhanta Nidanam*, 80.
78. Compare, for instance, Frederick Taylor Lord, *Pneumonia*.
79. G. Sen, *Siddhanta Nidanam*, 80.
80. Mukharji, *Doctoring Traditions*, 145.

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sign of some kind of distinctively Ayurvedic principle. We can recognize in them an attempt to mark a distance from biomedicine and emphasize some alternate pathogenic pathway.

What emerges then is an intricate braiding of different strands of therapeutic knowledge drawn from multiple sources. The germ-poisons clearly derive from a certain biomedical tradition, while the doshas emerge from an Ayurvedic one. What is further worthy of note is that these two traditions are in themselves heterogeneous. Thus, by the 1920s, biomedical authorities distinguished between two basic types of pneumonia: lobar pneumonia and bronchopneumonia. The latter did not have the same discrete prognosis that Gananath described. The extent of lung involvement in bronchopneumonia also varied. Thus, to constitute his Swasanaka-jwara, Gananath was drawing mainly on discussions of lobar pneumonia rather than bronchopneumonia. Similarly, there were a lot of Kavirajes who in the 1920s would not have emphasized the role of the foul smells in causing pneumonia (though they might well of course have accepted the role of smells in causing other kinds of fevers). Other Kavirajes might have objected to the notion of poisoned doshas invading an organ. The point is that Gananath did not simply draw upon two monolithic traditions. Will-ingly or accidentally, he drew upon specific strands from within two equally heterogeneous traditions. This is why I find it better to refer to the resulting formulation as a "braided science" rather than "hybrid knowledge."

The product of this braiding was a new, if only partial, image of the modern Ayurvedic body, or indeed more accurately, the thoracic cavity of the modern Ayurvedic body. Such inchoate and emergent images of the body, which came to be engendered in the shared technological cultures of modern Kavirajes, have been described as physiograms.[81] What we get in Gananath's discussions of Swasanaka-jwara in particular and *Agantu-jwaras* in general is a radically new image of the thoracic cavity being deployed by Kavijares through their use of the stethoscope.

Moreover, to the extent that, according to Gananath's schema, the poisoned *doshes* eventually enter and transform the lung in a way that is reflected in the deformed sonic signature it leaves on the stethoscope, we might say that the stethoscope also added a new auricular (and not just phonic) dimension to the doshes. What is heard through the stethoscope then is a sonic lung, but one whose soundings are different from the sonic lungs that biomedical doctors heard through their stethoscopes. The difference lay in the fact that the Kavirajes, when they heard the sonic lungs, heard in them the auricular traces of doshes, whereas biomedical doctors perceived merely the movement of air and fluids.

The inchoate image of the thoracic cavity that emerged in modern Ayurveda was a unique audile physiogram of the sonic lungs awash with

81. Ibid., 8–11.

doshes, influenced by putrid smells and timid minds, and capable of rotting away altogether. This unique and new image of the inside of the chest was engendered through the sounds that Kavirajes learned to listen to through their austere stethoscopes. Unfortunately, with this new organ the patients whom the Kavirajes treated also acquired new vulnerabilities in the form of new diseases like influenza and pneumonia.

## Conclusion

The stethoscope was gradually adopted into modern Ayurvedic practice from the 1890s onwards. Despite deep divisions between purists and syncretists in the interwar years, none objected to the adoption of the stethoscope. The only differences remained over how definitive and/or comprehensive was the information obtained via the instrument.

The smooth adoption was facilitated in part by the complete absence in Ayurveda of any significantly organized diagnostic attention to bodily sounds. This was unlike the western tradition where auscultation had a long genealogy. Ironically, it was precisely the long genealogy that created anxieties about loss of detail and skill through instrumentation, whereas in the Ayurvedic case such anxieties were absent.

The development of a new regime of diagnostic hearing did resonate with a range of other developments and acquired its own distinctive audile technique. It emphasized a more firmly sexually dimorphic anatomy, but eschewed the ostentation and constant drive for greater precision that marked the career of the stethoscope in biomedicine.

The development of a distinctive audile technique also gradually brought into view within Kaviraji circles a new, quasi-biomedical pair of lungs. These were quite distinctive from the organs classically recognized by Ayurvedic scholars. With these new sonic lungs also came a new understanding of respiration. The newly transplanted sonic lungs and their attendant system of respiration also brought new diseases like pneumonia. Each of these elements mutually reinforced each other. The stethoscope illuminated the lungs and the lungs acquired an objectivity through pneumonia.

Yet the sonic lungs were not simply a biomedical implant in a vacuum. Placed within an Ayurvedic body, they also acquired additional features absent in biomedical lungs. They became capable of being invaded by Ayurvedic doshes and, in extreme illness, rotting away. They also acquired the ability to be affected by putrid smells and timid minds.

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