

Bondi H. On spherically symmetrical accretion.
Mon. Notic. Roy. Astron. Soc. 112:195-204, 1952.
[Trinity College, Cambridge, England]

In this paper the special accretion problem is investigated in which the motion is steady and spherically symmetrical, the gas is at rest at infinity, and the pressure is proportional to a power of the density. The accretion rate is found to be proportional to the square of the mass of the star and to the density of the gas at infinity, and inversely proportional to the cube of the velocity of sound in the gas at infinity. [The *SCI*® indicates that this paper has been cited in over 260 publications since 1955.]

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My first employment came in early 1942 during the war, when I joined the Admiralty Establishment in which research was done for the development of naval radars. I was quite young (22) and had previously done only a minimal amount of research, which had led to the publication of one rather minor paper.

In addition to my interest in working on the then new centimetric waves and applying my mathematical skills to problems of aeriels, performance indicators, and so on, the great thing for me was that I was brought together with Fred Hoyle, who was already an established researcher and a most impressive personality. He interested me in astrophysical problems, a field with which I had had almost no contact previously. In particular, he and Raymond A. Lyttleton had worked on what they regarded as most important: the interaction between stars and interstellar gas and the problem of accretion. Under his guidance and influence, I made a major study of accretion in the case when the star is in motion relative to a cloud of cool gas and dust. I first submitted this to my college (Trinity College, Cambridge) for a fellowship, and indeed, I was elected a Fellow in October 1943 on the basis of this work. Later I published it in enlarged form with Hoyle in the *Monthly Notices of the Royal Astronomical Society*.¹

Accretion having thus been the basis of my first and decisive major step up the academic ladder, I naturally retained a liking for the subject thereafter. It is perhaps worth mentioning that in those days a fellowship at a major college was considered a very great distinction indeed, so much so that I stopped reading for a PhD, as the fellowship was considered a much higher and more recognised distinction.

After returning to Cambridge at the end of the war, I had a most productive period working with many different people, but the accretion problem still nagged at me a little, and I was concerned at not having studied at all the case where the relative velocity of cloud and star was not the dominant feature. I regarded this originally as a purely mathematical exercise, carried out for reasons of curiosity, because I did not think that there would be any significant astronomical application of a case of zero relative velocity. The work itself, however, was very intriguing, and when I had completed it I showed it to my friend Lyttleton, believing that it was a nice piece of work but hardly worth publishing. He said, "You never know, something may become significant," so I owe it to him that I proceeded to publish it, but I still did not expect it to be of such wide importance.

My first inkling of the significance of what I had done came when W.H. McCrea pointed out to me nearly a decade later that the paper I had written on accretion indicated a drag effect and therefore a substantial deceleration of the star relative to the cloud of gas. Therefore, it was in fact the spherically symmetrical case that was likely to be most important. The wide applicability of the model was seen by others rather later but has continued to this day.

My foresight regarding the significance of my paper was certainly not great. This has made it even more pleasant that this piece of work became so important for other people's research. [For a recent review that cites this paper see reference 2.]

[Editor's note: Bondi recently wrote about his work on gravitational waves for *THE SCIENTIST* 1(10):17, 6 April 1987.]

1. Bondi H & Hoyle F. On the mechanism of accretion by stars. *Mon. Notic. Roy. Astron. Soc.* 104:273-82, 1944. (Cited 130 times since 1955.)
2. Wiita P J. Active galactic nuclei. I. Observations and fundamental interpretations. *Phys. Rep.—Rev. Sect. Phys. Lett.* 123:117-213, 1985.