so will not contain $A(K)$ where K is the state space of A. Nevertheless, $S(A)$ proves to be useful in analyzing facts about A. The primary tool of the authors is the use of the *complex state space*, the convex hull of $\alpha S(A)$ and $\beta S(A)$ for suitable complex scalars α and β. The authors use this framework to derive many of the classical results of peark and interpolation sets for function algebras. (The Hoffman-Wermer theorem, the Bishop peak point theorem, and the Rudin-Carleson theorem appear as corollaries to the developments here.)

The final chapter discusses convexity theory for C^*-algebras. The center and primitive ideal space of a C^*-algebra are given geometric characterizations, and the Dauns-Hoffman theorem (that the center consists of those elements of A which induce a continuous map on the primitive ideal space) is proved. The results of Effros and Prosser giving a duality of ideals of A and faces of $S(A)$ are derived. The book ends with a discussion of the results of Alfsen, Hanche-Olsen, Størmer, and Shultz characterizing those compact convex sets which are affinely homeomorphic to the state spaces of Jordan and C^*-algebras. The authors do an excellent job of giving a self-contained summary of these characterizations, including proofs of several key results.

The authors have done a nice job of presenting a large amount of diverse material in a cohesive and self-contained fashion. The material is presented clearly and succinctly, with well-chosen examples. The choice of topics is excellent—a variety of the most appealing results of the last twenty years or so in this area. (This is also an area in which the authors themselves have been quite active.)

The book would perhaps be a little difficult to use for quick reference. Results are sometimes stated in fairly complicated notation, with the notation (and some assumptions) explained in the preceding text. Thus a reader who is only browsing may have some difficulty following the spirit of the lemmas. (This should not cause any problems for the serious reader; in any case, this is only a localized problem.) In general the book makes for very enjoyable reading.

The material here has little overlap with that available elsewhere in books (e.g. the books of Alfsen and Phelps). I highly recommend the book for the functional analyst interested in a self-contained presentation of many of the most interesting results in this field in recent years.

FRED SHULTZ

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John von Neumann and Norbert Wiener, from mathematics to the technologies of life and death, by Steve J. Heims, MIT Press, Cambridge, Mass., 1980, xviii + 547 pp., $19.95 (HB), $10.95 (PB). ISBN 0-2620-8105-9

By its title this book alerts the reader without any circumlocution that the author is not concerned primarily with writing biography but has set out to compose a contemporary morality play. His symbolic protagonists are Saint

Norbert and Saint John Lucifer. The choice is apt. Saint Norbert shines forth as the valiant champion of a noble creed, of which the author, to be sure, is a passionate advocate. This creed is the "populist" philosophy of "socialized" science that has become so fashionable in some "liberal" and academic circles since World War II. Von Neumann's role is to exemplify the corruption and inhumanity hidden in the old belief in "science for science's sake", relieving the scientist of the responsibility for guaranteeing the consequences, proximate or even remote, of his discoveries. The overt acts used to identify von Neumann as an agent of evil were his work at Los Alamos on the atomic and hydrogen bombs and his service on the Atomic Energy Commission, acts treated as doubly suspect because they are alleged to reveal a lust for power that reflected his bourgeois origins. In the author's eagerness to sharpen the contrast he wants to draw between his two protagonists, he lets himself be betrayed into describing von Neumann's personality, career and motivations in pejorative terms that can only be resented by those who knew him well. In this reviewer's opinion, the author has thereby done von Neumann a monstrous injustice in a single-minded resort to an argument ad hominem.

This unhappy outcome of the author's concentration upon the advancement of his creed is rooted in inadequate scholarly treatment of the biographical materials on which the book could and should have been based. In Wiener's case this does not have major importance because Wiener wrote so much autobiographical and semibiographical material that he is in little danger of being misunderstood or misinterpreted. Furthermore he has found a competent biographer in Pesi Masani [Masani, **1**, **2**]. On the other hand, there is little personal, autobiographical, or philosophical material to be found in von Neumann's writings; and no serious biography of him has yet been undertaken so far as the reviewer knows. The bare facts reported in this book are accurate enough so far as they go. However, there are very important omissions and many over-facile interpretations offered in convenient support of the author's purposes. The author, who is a physicist rather than a mathematician, does not try to give full accounts of the mathematical achievements of his two protagonists. He is not to be faulted for this. However, the selections he makes, while appropriate and relevant to the theme of his book, will leave the reader with a woefully inadequate appreciation of the mathematical stature of these giants. The reader who wants to inform himself further can now consult the collected works of both men. [von Neumann, **1**, Wiener, **1**]. The author is correct in judging that Wiener was the more intuitive, von Neumann the more analytical in his grasp of mathematics. However it seems to the reviewer that he greatly exaggerates this distinction and bases quite mistaken estimates of von Neumann's character and motivation upon it. Von Neumann's fruitful interest in logic, his liking for axiomatic presentations, and even his wonderful facility in doing mathematics in his head are used to brand him as "inhuman". Shades of Bertrand Russell! Indeed the author becomes so obsessed with this perception of von Neumann's "inhumanity" that in his final chapter on his subject, the fourteenth in the book, captioned "Only Human in Spite of Himself", he surpasses all bounds in an incredibly cruel and unfeeling description of von Neumann's tragic last days.

The reader will have little difficulty in identifying and appraising for himself those passages where the author resorts to tendentious interpretations in making his case against von Neumann. However, omissions are another matter altogether. If inadvertent, they may distort; if deliberate, they are inexcusable. There are important omissions in this book. The reviewer believes that the reader has a right to be warned of them and should have the privilege of compensating for them in his own way.

The author claims that von Neumann worked at Los Alamos and served on the Atomic Energy Commission because he had a bourgeois admiration of the powerful and a bourgeois ambition to acquire power. The appreciation for worldly success and pleasure in enjoying it are quite human attributes that could not have been lacking in von Neumann's character, despite his genuine modesty concerning his own achievements. Beyond this, the author's claims are assertions that need some justifying evidence to back them up. No such evidence is produced here. Nothing is said about the steps von Neumann took or may have taken to assure himself of a call to Los Alamos or an appointment to the A.E.C. Neither is anything said about the power von Neumann is supposed to have exercised in either place.

The path that led to Los Alamos was actually a rather round-about one for von Neumann. In the early days of America's preparation for World War II mathematicians were not eagerly sought by the authorities, military or civilian, as potential collaborators. Indeed, some of the leading mathematicians of the day banded together in order to convince the authorities of the usefulness of mathematics and mathematicians. A young mathematician, even one as brilliant as Wiener or von Neumann, had little chance of obtaining a war assignment by his own unaided efforts. He needed the sponsorship of some more prominent and influential mathematicians. Oswald Veblen of the Institute for Advanced Study in Princeton had an opportunity to recommend his young colleague von Neumann for a post, which as it happened, had nothing whatever to do with atomic physics or atomic weapons. The Navy Department desired to set up a mine warfare operations analysis group under the scientific direction of Francis Bitter, an M.I.T. physicist specializing in magnetism. Lt. Commander Bitter included several mathematicians in his group—von Neumann, J. L. Doob, the reviewer, and von Neumann's assistant J. W. Calkin, who had been a doctoral student of the reviewer. Von Neumann and Calkin were active in this group in 1942–43 until they were invited to Los Alamos. Doob remained there until the end of the war, while the reviewer left in 1943 for another assignment. In the Navy Department von Neumann worked mainly on shock waves and damage by explosives. In several conversations with this reviewer he outlined his view that this kind of problem was typical of a very broad mathematical problem—the solution of partial differential equations—that would require the use of computers to explore empirically their little-known behavior. In particular he was fond of pointing out that no theory of meteorology could be usable until the day when massive weather data from a large area could be processed by computers in an hour or so. In connection with his immediate studies, von Neumann and Calkin were sent to England to learn of the progress under way there. Presently it appeared that their special knowledge would be useful at Los Alamos and they moved there. The work they were first asked to do there seems to have been to participate in developing the implosion techniques for exploding an atom bomb, involving the principles of aero- and hydrodynamics. Beyond this point in history, the reviewer cannot go. It should be evident, however, that a serious biographer would have to make a determined effort to find out more about von Neumann's work at Los Alamos and about his role as a member of the A.E.C. Until it is possible to answer in some detail, even if incompletely, questions like those raised here, it will not be possible to comment intelligently upon his motives, his ambitions, or his alleged quest for power in relation to his war work. The reviewer's long acquaintance with von Neumann leads him to believe that von Neumann took too detached and at times too cynical a view of human affairs to harbor any deep illusions about power or its exercise. Von Neumann is said to have been a close student of Byzantine history. He can hardly have failed to learn some unforgettable lessons from the hours thus spent!

The truly astonishing omission from the author's biography of von Neumann is the almost complete lack of any reference to the dominating interest of von Neumann's scientific and intellectual life after World War II—from 1945 to 1957, the year of his death. No mathematician was closer to John von Neumann after 1944 than H. H. Goldstine. In his authoritative book on *The computer from Pascal to von Neumann* [Goldstine, **1**] published in 1972 and reprinted as a soft-covered volume in 1977, Goldstine writes, "In thinking about von Neumann's contribution, I am of the opinion that he perhaps viewed his work on automata at his most important one, at least, the most important one in his later life. It not only linked up his early interest in logic with his later work on neurophysiology and on computers, but it had the potential of allowing him to make really profound contributions to all three fields through one apparatus. It will always be a fundamental loss to science that he could not have completed his program in automata theory, or at least have pushed it far enough to make clear, for example, what his ideas were on a continuous model. He was never given to bragging or staking out a claim unless it deserved it; I am therefore confident that he had at least a heuristic insight into the model and at least some idea how it would interact on logics and neurophysiology. Finally, it is interesting to note that von Neumann worked on his theory of automata alone. This was in rather sharp distinction to most of his later work, where his practice almost always was to work with a colleague. Very possibly he wanted his automata work to stand as a monument to himself, as indeed it does."

This reviewer can corroborate the impression conveyed here by Goldstine. After a close friendship wih von Neumann from 1927 to 1943, the reviewer had only infrequent meetings with him, such as a very lively and enjoyable luncheon at the Amsterdam Congress in 1954. Von Neumann had already received the first warnings of what was to be recognized eventually as a mortal illness. The next and last meeting took place when he was already confined to his bed in the hospital. His engineering associate Julian Bigelow was present during the conversation but took very little part in it. Von Neumann dwelt at some length on his deep desire to devote himself to a very ambitious program of work with computers, and to broadening the fields he had already started to open up. He expressed his wish to leave the Institute for Advanced Study and to move to the West Coast with facilities better suited to his plans than those available at the Institute. Had the opportunity been granted him, he would probably have overshadowed his earlier achievements. Unless this testimony about von Neumann's last and possibly brightest scientific goal is placed on record, no balanced view of him as scientist can be formed and no fair measure of his career or his motives established.

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Fixed point theory: An introduction, by Vasile I. Istratescu, Mathematics and Its Applications, Vol. 7, D. Reidel Publishing Company, Dordrecht, Holland, 1981, xv + 466 pp.

The fixed point theory started almost immediately after the classical analysis began its rapid development. The further growth was motivated mainly by the need to prove existence theorems for differential and integral equations. Thus the fixed point theory started as purely analytical theory. In 1920 S. Banach formulated and proved the general contraction principle in complete metric spaces, which became soon a powerful tool in both classical and modern analysis. Due to its simplicity and generality, the contraction principle has drawn attention of a very large number of mathematicians. After the period of enormous development of linear functional analysis the time was ripe to focus on nonlinear problems. Then the role of the analytical fixed point theory became even more important. On the other hand, the topological fixed point