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Banach modules and functors on categories of Banach spaces, by Johann Cigler, Viktor Losert, and Peter Michor, Lecture Notes in Pure and Applied Mathematics, Volume 46, Marcel Dekker, New York, 1979, xviii + 282 pp., $29.50.

As the authors state in their preface, this is a book about "general nonsense", a term indicating the uneasy attitude many of us have towards the material. This term cannot be other than perjorative–why should a valid and necessary part of an argument get such scant respect? Many of us lose patience with a tower of increasingly complicated general propositions with a liberal scattering of words like natural and contravariant with perhaps a diagram which when chased enough merely states the obvious–why can't we stick to something interesting like operator theory where there are real theorems? And yet there must be another side of the coin or the subject would not attract the attention of enough competent mathematicians to survive–what can it be? One ingredient in our reaction is the reluctance to take a new point of view, learn some new words and a new way of looking at things. Former generations reacted similarly to modern analysis and abstract algebra. However some notions really do need this generalized framework, for example the concept of a tensor norm. Often this is defined as a norm on a product $X \otimes Y$ of Banach spaces but the way the term is used is more in keeping with thinking of it as a description of a norm on each possible $X \otimes Y$ with various relationships between the norms so described–if you accept this you are immersed, though perhaps only up to your knees, in the sea of categories and functors. Similar remarks apply to the definition of operator ideals, which takes you in up to your waist, and then thinking about the relation between spaces of linear maps, summable operators, quotients, subspaces and duals–well perhaps one should learn to swim after all.

For the novice there is of course a big difference between swimming in your depth where, if in trouble, you can revert to a more familiar attitude, and moving into deeper water. In the book under review the change occurs about 2/3 of the way through, at the beginning of Chapter 4. The first three chapters cover familiar material about Banach spaces, tensor products and modules over Banach algebras though there are categorical overtones. The remainder deals with material which will be new to many functional analysts. Just as in Banach algebra theory the basic object of study is the algebra of bounded operators on a Banach space and its closed subalgebras, in Banach category theory the basic object is some set of Banach spaces and the bounded maps between them. Obviously the composition product of two such maps is not always defined but algebraic category theory is designed to cope with exactly this problem. Representations of Banach algebras, that is Banach modules, from the more familiar theory are replaced by functors from the Banach category into the category of all Banach spaces. Notions such as tensor products extend to the more general situation too.

One advantage of discussing a subject so ill thought of as "general nonsense" is that it doesn't need much to show that the reputation is undeserved and the authors certainly achieve this and more. On the other hand it is fair to say that the subject is mainly descriptive and does not solve any pre-existing problems–as did the Banach algebra approach to Wiener's theorem for example. For anyone curious to see how category theory can be applied to the basic structures of functional analysis this is a lively introduction with plenty of applications to concrete situations. The reader unfamiliar with the basic notions of category theory (e.g. category, small category, full subcategory) will need to familiarize himself with them from another source as they are not explained here–an unfortunate blemish but not a fatal flaw.

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GO-spaces and generalizations of metrizability, by J. M. van Wouwe, Mathematical Centre Tracts, Volume 104, Mathematisch Centrum, Amsterdam, The Netherlands, 1979, x + 117 pp.

The general topology of product spaces is a theory which bristles with counterexamples. Think of a good question concerning normality, paracompactness or the Lindelöf property in product spaces, and chances are that an example, rather than a theorem, will settle the matter. Many of the most durable of these examples are built using lines of various kinds. Must the product of two paracompact spaces be paracompact? No, consider the square of the Sorgenfrey line–it's not even normal [S]. Must the product of a