MOMENTS

The Problem of Moments. By J. A. SHOHAT and J. D. TAMARKIN. xiv + 140 pp. American Mathematical Society.

THIS slim volume is the first in a series of "Mathematical Surveys," sponsored and published by the American Mathematical Society. And a good beginning it is. The authors have deftly assembled a wealth of results, mostly of somewhat specialized nature, and yet merging into general concepts.

The problem of moments, though rather special in its inception, was productive of the powerful concept of the Stieltjes integral and, in some measure, of the concept of an orthogonal system. In this respect, in the field of analysis it is second only to the problem of Fourier series which produced Cantor's set theory and Riemann's integral, and, to some extent, also Lebesgue's integral.

The authors are aware of this role of the moment problem but in outlining gentralities they are brief and to the point. They succeed in introducing the different variants of the moment problem as just so many problems in representing positive functionals on partially ordered function spaces, without mentioning the latter concept by name. Or again, they derive all pertinent facts about quasi-analytic functions as far as their problem is concerned without featuring the topic as such. However in expounding the connection with continued fractions they are emphatic in suggesting that, in substance, the problem is one of characterizing anlytic functions of a complex variable whose imaginary part is positive in a half-plane. No account of such functions is complete without reference to Hermitian operators in Hilbert space, but the authors omit the reference for lack of space. The authors' heart is obviously in "classical" analysis, and so they include a chapter on approximate quadrature instead.

This and similar books will be a good reminder to younger mathematicians that "modern" mathematics is not all abstract spaces, group theory and such like.

S. BOCHNER

SPECIAL ARTICLES

THE EFFECT OF pH ON THE AVAILABILITY OF p-AMINOBENZOIC ACID TO NEUROSPORA CRASSA[1]

SOME sulfonamides become more active as the pH is increased, this enhanced activity paralleling the ionization of the sulfonamide.[2] However, Schmelkes[3] has pointed out that sulfonamides which are so substituted as to preclude ionization also increase in activity as the pH is increased, a fact which is unexplained by the ionic theory of sulfonamide action. Since the undissociable sulfonamides supposedly do not undergo any change in the pH range involved, such an effect might be ascribed in part to decreased activity of *p*-aminobenzoic acid. The work of Brueckner[4] with *Staph. aureus* suggests that *p*-aminobenzoic acid, as well as the ionizable sulfonamides change in effectiveness as the pH is altered. But it is difficult to divorce the effect of pH on the sulfonamide from that on *p*-aminobenzoic acid in such bacterial inhibition experiments involving both of these compounds. The *Neurospora crassa* mutant of Tatum and Beadle was considered a more suitable test organism because it requires an exogenous supply of *p*-aminobenzoic acid, thus affording an opportunity to study the action of pH on the effectiveness of this substance alone.

The fungus was grown in a nutrient solution consisting of 25 g dextrose, 1 g potassium dihydrogen phosphate, 0.5 g magnesium sulfate, 2 g casein hydrolysate, 1.32 g Norit-purified fumaric acid, 0.2 ppm each of iron and zinc, 0.1 ppm manganese, 1 microgram biotin and 1,000 ml distilled water. Enough sodium hydroxide was added to adjust the pH to the various levels. Twenty-five ml of this solution was placed in 250 ml flasks, autoclaved, inoculated with a loopful of a suspension of germinating spores and incubated for 72 hours at 25° C. The mycelium was harvested, dried at 85° C. for 24 hours, and weighed.

TABLE 1

THE EFFECT OF pH ON THE GROWTH OF *Neurospora crassa* MUTANT IN THE PRESENCE OF VARIOUS AMOUNTS OF *p*-AMINOBENZOIC ACID

Micrograms of *p*-aminobenzoic acid per 25 ml of nutrient solution	The average weight in mgs of dry mycelium per flask			
	pH 4.0	pH 5.0	pH 6.0	pH 7.0
0.0	0.0	0.0	0.0	0.0
0.00625	8	..	..	..
0.0125	8	3	..	..
0.025	15	8	..	..
0.05	28	20	3	..
0.1	33	37	8	4
0.2	36	23	16	4
0.4	35	27	18	5
0.8	..	29	38	42
1.6	..	..	34	33
3.2	..	..	..	59

Table 1 gives the different treatments and the results.

The foregoing picture remained essentially the same

[1] Published with the approval of the Director of the West Virginia Agricultural Experiment Station as Scientific Paper No. 314.

[2] F. C. Schmelkes, O. Wyss, H. C. Marks, B. J. Ludwig and F. B. Strandskov, *Proc. Soc. Exp. Biol. and Med.*, 50: 145, 1942.

[3] F. C. Schmelkes, *Jour. Bact.*, 45: 67, 1943.

[4] A. H. Brueckner, *Yale Jour. Bot. and Med.*, 15: 813, 1943.