as some time will necessarily elapse between submission of the article for publication and its appearance, the present note is intended to give preliminary information as to the mechanism of action of the Clarase and Taka-Diastase preparations upon penicillin reported previously.

Other diastatic enzyme systems than those of Clarase and Taka-Diastase used in our preliminary studies on penicillin, although derived also from the fungus, *Aspergillus oryzae,* failed completely to show evidence of antipenicillin activity. Subsequent studies revealed that the preparations active against the antibiotic agent contained, in addition to diastase or amylase, certain water-soluble, filtrable substances, which are of bacterial origin and which are responsible in part, if not entirely, for penicillin inactivation. Broth filtrates of pure cultures of many of the organisms isolated from the active enzyme preparations will neutralize the effects of penicillin. These bacteria have been identified as belonging to the gram-positive, spore-forming *B. subtilis* and related groups of organisms.

Therefore, the demonstrated power of Clarase and Taka-Diastase to inactivate penicillin in the sterility test is due to bacterial end products which these preparations contain.

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THE IDENTITY OF CLAVACIN WITH PATULIN

WAKSMAN, Horning and Spencer[1] investigated the antibiotic agent produced by *Aspergillus clavatus* (No. 129) and proposed the name clavacin for this substance. Some time ago we began a study of the production, isolation and chemical properties of clavacin. Dr. Waksman kindly supplied one of us (H.W.A.) with *Aspergillus clavatus* (No. 129) which was grown on a Czapek-Dox medium modified as recommended by Waksman. The active material was extracted from the mold culture with ether. The ether solution was evaporated, leaving a brown gum from which the clavacin was extracted with a small volume of water. The aqueous solution was re-extracted with ether and the clavacin was obtained either by direct crystallization from the concentrated ether solution or after a preliminary purification over a silica gel column. The column was developed with moist ether which removed colored impurities first and then the clavacin. The crude material was readily purified by recrystallization from ether. The following data concerning the pure substance have been obtained: Melting point, 109–10° C; empirical formula, $C_7H_6O_4$; molecular weight (cryoscopic in benzophenone) 151, 157; $C_7H_6O_4$ requires 154); semicarbazone, darkens at 200°, decomposes at 290° C; 2,4-dinitrophenylhydrazone, darkens above 190°, decomposes about 300° C; lactone group indicated by slow reaction with alkali; saponification number 69, 71 (evidently molecule cleaved); Zereiwitinoff determination (in *n*-butyl ether) shows slightly less than one active hydrogen per mole; esterification by the acetic anhydride-pyridine method shows one hydroxyl per molecule. The substance is a neutral compound, darkens and loses activity in the presence of alkali, readily decolorizes alkaline permanganate, does not react with aqueous ferric chloride or Schiff's reagent, and is optically inactive.

At this point in our studies a publication by Raistrick and coworkers[2] appeared describing the substance patulin, an antibacterial agent produced by *Penicillium patulum* Bainier. Patulin has the same physical and chemical properties as clavacin. The 2,4-dinitrophenylhydrazones behave in the same way on heating. In order to extend the comparison the acetyl derivative and phenylhydrazone of clavacin were prepared. They melted at the same temperatures (116–117° and 151–152° C, respectively) as the corresponding derivatives of patulin. These results establish beyond question that patulin and clavacin are identical. The fact that both an *Aspergillus* and a *Penicillium* mold produce the same antibiotic substance and in about the same amount is sufficiently unusual to warrant publication of a brief note at this time. The details will be reported later.

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SCIENTIFIC BOOKS

UNDER A LUCKY STAR

Under a Lucky Star. A Lifetime of Adventure. By ROY CHAPMAN ANDREWS. 300 pp. The Viking Press. New York. 1943.

THE title of this book would seem to imply that fortunate circumstances were the making of Roy Chapman Andrews. But I think nearly all readers, nearly all those who know Andrews and his work will

[1] Waksman, Horning and Spencer, *Jour. Bact.*, 45: 233, 1943.

[2] Raistrick, Birkinshaw, Bracken and Michael, *Lancet*, 245: Part II, 633, 1943.

feel that the star might have shone for them in vain. The real lucky star was internal rather than external, the extraordinary character of the man, so tenacious of purpose, so skilled in carrying out his plans, so convincing to those who came in contact with him. I have a lively recollection of the occasion when he lectured at the University of Colorado. He had plenty of excellent pictures to show us, but he talked for two hours, and when he stopped I think there were few in the audience who would not have been glad to have him continue. I think it was the best popular scientific lecture I ever heard, and, lecturing as he did all over the country, he not only raised money for his next expedition, but sowed seed in the minds of thousands of listeners, seed which may yet produce a crop of scientific discoveries.

His earlier work, on whales and porpoises, tested his strength of purpose. He says:

> In thinking back over a somewhat adventurous life, my considered opinion is that nothing I have ever done required more unadulterated guts than going out on those tossing, twisting whaling vessels with the certain knowledge that I would suffer the tortures of the damned. Often I was so weak that I lay on the deck behind the harpoon gun like a dead thing and only when one of the sailors lifted me to my feet and hooked my arm about a stay could I work the camera and take my notes.

Later in life he got over susceptibility to seasickness, but this was after he had finished his work on the Cetacea.

Very interesting is his description of the Japanese in earlier times:

> My life in Japan, thirty-three years ago, might have been lived in a different country and with people of a different race, judging by the present-day Japanese. Seemingly the people I knew, and liked, have no relation whatever to the inhuman creatures we are fighting in this war of horror. . . . The everyday Japanese was a likable person, simple, full of *joie de vivre* and the worship of beauty. . . . I watched them change year by year with amazing rapidity, as they assimilated more and more Germanic ideas and *Kultur*. I saw them lose much of their courtesy and kindliness, their simplicity and charm. Each time I returned to Japan, there was less that was admirable and more of those characteristics which stamp the Japanese of to-day with the infamy of treachery and inhuman cruelty.

I can say that only twenty years ago, when in Japan, I was treated kindly and found much to admire. One may only hope that in years to come the virtues the Japanese had, they may regain, and once more contribute to the good of the world, in their own unique fashion.

The fossil-hunting expeditions to Central Asia have been so often described and illustrated in print that there is no need to review them here. But we must call attention to Andrews' plans or ideals for the future—a future he may not live to see. He believes that when the war is ended we shall see a new era of intensive exploration. Every part of the earth will be visited, but most important is Central Asia—Mongolia, southern Siberia, Chinese and Russian Turkestan and Tibet. "There is no other region on earth which will yield such important results in every branch of natural science. . . . The scientific attack must be made systematically like the campaign of an army to insure best results. It must be international."

Any one who reads the accounts of the Gobi expeditions will realize that, important as the results were, they represent only a minute fraction of what is to be found in that vast region. In the future we may expect that these regions will be opened up and, as in the case of Central Africa, will be easily reached with no great expense to the explorers. It will no longer be necessary to appeal to the millionaires, if any such survive in those days.

Andrews has written six books, but this is an autobiography, and I venture to suggest that it should be made over in several respects, to be more worthy of its theme. I should like to see it illustrated, with portraits of the author and his most distinguished colleagues, and figures of some of the more interesting fossils discovered, and of the scenery of the Gobi. I would leave out the chapters on organized vice in Japan and China, and insert an account of vertebrate paleontology in Asia, showing the work of the Andrews expeditions in relation to that of other workers, and thus bring out its importance as part of the progress of science. Thus, in the account of *Baluchitherium,* nothing is said of the gigantic skeleton which I saw (and Andrew must have seen) in the museum at Leningrad. We are told that Andrews was intimate with Dr. Davidson Black, who was "studying the remains of the 'Peking Man,' a primitive human discovered in the Western Hills." Nothing more, nothing to show that while Andrews was searching the Gobi for primitive man (where he will doubtless eventually be found), Black had obtained the very primitive *Sinanthropus* not far from Peking.

Some revision and amplification are needed. For example, we still see reported the fossil butterflies found in the Gobi. This was an excusable error made in the field, but long ago these specimens were studied, and reported on, with illustrations, in the publications of the American Museum. They are gigantic mayflies.

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