of monads, and which Klebs names, because of their spirillar shape, *"helico-monads"*; (2) cultures of these organisms are obtained on a special medium of isinglass jelly; (3) successful transfer of syphilis to animals was obtained only in apes (*macacus*), very suggestive but not entirely conclusive results in the case of subcutaneous inoculation of culture material (July 8, 1875), entirely conclusive in the case of inoculation with freshly excised material from a human primary lesion (December 29, 1877). At this distance we have of course no means to control the exactness of all these findings. They are certainly impressive in view of the similar later findings. From what Professor Ghon told me some years ago, the pathological institute in Prag still has the skull of the second ape with the very characteristic lesions.

If attention is called here to these overlooked facts, it is not done with the intention of making a claim for priority or for historical justice. It is unnecessary, for good work can stand on its own feet, and anyway, as Bertrand Russell might say, its neglect by others has no "cosmic importance" whatever. But it is of human interest, if not of importance, to note from these diggings in the past the two historical phases in etiological research. Leaving the broader, pathological consideration of the rôle of microorganisms in animal economy, research assumed the form of a vast enterprise with the elaboration of a highly specialized methodology which focuses attention exclusively, or almost so, on the microbe or virus, forgetting, or at any rate neglecting the fact that there is a human structure, a whole man, "himself a biological problem of no mean order," as Stokes well remarks. That the fruitfulness of an original idea is extinguished by the weight of subsequent methodological refinements is nothing new in history. The impressive edifice of medieval scholasticism erected upon Aristotelian and Platonic ideas is *the* gigantic monument to these vicissitudes of human thought. And do we not sometimes detect in the experimental subtilizations of modern research a resemblance to the scholastic method of syllogistic hair-splitting?

Results of course ought to tell. For the case under consideration Stokes notes regretfully that Schaudinn's discovery "has never yet been carried to its logical outcome for practical medicine," and that even the chemo-therapy which it directly incited "was, in a sense, a premature blooming." But one marked effect it did exert. It called forth a very rapid acceptation by the profession which was expressed, Stokes says, in the appearance of 750 articles in about one year. In view of the negative practical results was there really a compensating theoretical gain in such literary overproduction? One has reason to doubt it when one sees how the bulk of the literature is swelled by purely classificatory and methodological reports which effectively screen a hustling world of workers from a view of the things that really matter. If we have made so little advance in the twenty-five years after Schaudinn's discovery, so that we do not know any more about syphilis than Klebs knew fifty-five years ago, it seems high time that we ask ourselves whether both theory and method are not defective somewhere. Luckily this question is being asked ever more audibly.

Another more general question is asked by Stokes as to the relative value in modern investigation of "genius" or the man of "persistent singleness of purpose" by which he means the strictly limited, specialistic worker. He declares himself for the latter, being dubious about "genius," though he thinks he "may still perhaps scatter over the whole field of a science a series of germinal or epochal discoveries." Hence he is not quite ready to agree with the Soviet delegates who last spring, at the History of Science Congress in London, pleaded with no mean dialectic ability for a history which was not "biographical apologetics or apologetic biography. . . Only when science itself is understood to be a function of society can there be given a scientific history of knowledge. Only because knowledge is an integral part of social life, is the history of knowledge an integral part of history."[3] Our current histories, our current speech, it must be admitted, utter the word "genius" too frequently and too loosely. It may easily be argued that in science there only once was a genius and that his name was Aristotle, for not only his fame but his contribution to thought have endured two thousand five hundred years, and it still influences us in every phase of scientific activity. "Genius" derives from sexual propagation, but the goodness of its productions can not be measured by the tons of lifeless paper—it has only a living measure in time. Indeed "art is long and life is short."

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NOVEMBER 10, 1931

A NEW AUTOTROPHIC BACTERIUM WHICH OXIDIZES AMMONIA DIRECTLY TO NITRATE AND DECOMPOSES PETROLEUM

IN connection with the studies of the senior author[1] on living microorganisms in ancient rocks an attempt was made to determine whether or not other old materials than rocks harbor living microorganisms. Among

[3] N. Bukharin: In symposium on "The Sciences as an Integral Part of General Historical Study," June 30, 1931 (mimeographic report). The subject is also discussed in the same manner in SCIENCE (p. 497, Nov. 20, 1931) in the interesting and valuable address of Professor Cecil H. Desch.

[1] *Jour. Bact.*, 22: 3, 183, September, 1931.

such materials studied was petroleum. An attempt to find cellulose destroying organisms in petroleum, by inoculating the latter into a cellulose medium, yielded an organism which apparently has no power to decompose cellulose but which has an extraordinary physiology. It was isolated from petroleum derived from a well over 8,700 feet deep owned by the Standard Oil Company of California. The organism is a coccus or cocco-bacillus, variable in size and somewhat so in shape. It grows very well under strictly autotrophic conditions in an inorganic salt medium with ammonium sulphate or potassium nitrate as the source of nitrogen. It oxidizes ammonia directly to nitrate without passing it perceptibly through the intermediate step of nitrite formation, as do the group of bacteria known as nitrifying bacteria. The nitrate-producing power, moreover, is manifest very quickly under such conditions—much more so than is true of the nitrifying bacteria. It is apparently a facultative aerobe and a facultative autotroph. In addition it possesses the power of completely decomposing petroleum without apparent gas formation aside from the end-product gas-carbon-dioxide.

We have noticed in the literature two or three cases in which organisms isolated from soil were described as possessing the power to oxidize ammonia directly to nitrate. These reports have never been confirmed and the other powers attributed to our organism above have not been indicated in such earlier reports. A full account of our investigation with this remarkable organism will be published elsewhere, together with a comparison of our results with those of Kaserer, Söhngen and others whose work has a bearing on the subject under discussion.

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GROWTH INHIBITION OF POTATO SPROUTS BY THE VOLATILE PRODUCTS OF APPLES

Volatile substances from ripe apples have been found to inhibit the normal sprout development of germinating potatoes. Potted germinating seed pieces, held under favorable conditions for growth and placed in closed containers or in closed rooms with ripe apple fruits, have uniformly produced sprouts which failed to develop normally. Apical growth of the sprouts is practically stopped and small stem-tubers instead of normal sprouts may develop. When non-germinated seed pieces are placed under the influence of these volatile substances, bud dominance in potato eyes is largely overcome and abortive multiple sprouting results.

Inhibited growth due to the volatile products from apple fruits has been observed with the following six potato varieties obtained from six different states: Irish Cobbler, Bliss Triumph, Russet Burbank, Spaulding Rose No. 4, Early Ohio and an undetermined variety. The volatile substances from the four apple varieties, Winesap, Stayman, Jonathan and Ben Davis, have caused the inhibition. The inhibitory effect was obtained from peeled apples as well as from the unpeeled fruits.

No growth inhibition has resulted from the volatile substances of oranges, bananas, decayed apples or from iso-amyl-valerate (apple oil). Immature apples did not produce normal growth arrestment, but these same fruits, after ripening, produced the inhibition. In a single test where ripe Kieffer pear fruits were used with germinating potatoes, growth inhibition similar to that produced from ripe apple fruits resulted.

The effect of the volatile products of apples is transitory, and normal sprout development takes place after potatoes are removed from their influence.

In a preliminary test, potato tubers stored with apples in closed containers until June remained firmer and of better quality than did the control tubers.

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BREAKING THE DORMANCY OF TREE SEEDLINGS BY CHEMICAL TREATMENT

In connection with the ethylene chlorhydrin treatment used by Deuber and Bowen[1] to shorten the rest period of sugar maple seedlings, it may be of interest to report a similar treatment recently given to both sugar maple (*Acer saccharum*) and chestnut (*Castanea dentata*) seedlings.

A dozen sugar maple seedlings, four feet in height, were potted and brought into the greenhouse during the early fall before there was any change in their summer foliage. They were kept under warm greenhouse conditions, where they did not experience the normal seasonal changes during the fall and winter. When spring came and the outside trees began growth these greenhouse seedlings remained dormant, and, it became evident that it would be necessary to substitute some artificial treatment for the normal winter exposure in order to break their dormancy. This was accomplished by keeping them exposed for a period of three days to the vapors from 25 milliliters of ethylene chlorhydrin diffused in 450 liters of air space. One half of the potted seedlings were so treated and the remainder left as checks. In making this treatment, the chemical was absorbed by a small piece of cotton and placed with the seedlings in a tightly sealed, metal chamber of the type used for seed

[1] C. G. Deuber and P. R. Bowen, "Chemical Treatment to Shorten the Rest Period of Sugar Maple Trees," Science, July 26, 1929.