ods of accomplishing this purpose are too few and for some time but few advances in method have been obtained along the lines recently pursued. One conspicuous advance was the determination of the lethal action of ultra-violet light on tubercle bacilli, *in vitro*[1] and in air.[2] Good diagnosis also has been obtained and this has made possible a policy of detection and slaughter of infected livestock, and a parallel policy of detection and segregation of infected humans. The perfect fulfilment of these policies would doubtless be quite effective, but is severely hampered in various parts of the world by the tremendous cost of execution. This country alone has roughly two million[3] tuberculous humans, and in comparison with other countries our own is an island of safety. In recent years, as frequently pointed out in your columns,[4] a group of scientists at this university have given us a brilliant new lead: Chemical air disinfection in closed spaces. With respect to tuberculosis this lead has remained undeveloped.

I have recently determined, by guinea pig test, the fact that tubercle bacilli (Ravenel bovine-type), in fine suspensions at 70° F are rapidly killed by immersion and agitation in propylene or triethylene glycol of 60, 70, 80 or 90 per cent. strengths. Of 82 guinea pigs subcutaneously inoculated with tubercle bacilli subjected to such treatments for 3-, 5-, 10- or 15-minute periods, not one animal showed as large and numerous lesions as control animals, at the site of injection, regional and iliac lymph nodes, spleen, liver and lungs. Rapid and extensive destruction of pathogenicity invariably occurred. In 80 per cent. propylene glycol this destruction was complete within 5 minutes and in triethylene glycol within 15 minutes. Even in lesser concentrations death was often complete within 15 minutes. Minor irregularities in the outcome may have been due to variations in the size of bacillary aggregates in various tests.

Since the glycols, as vapors, are infallibly attracted to moist dust in the air, and kill almost all non-spore-bearing bacteria[5] if suspended in properly humid air, it is difficult to escape the conviction that a useful degree of chemical air disinfection of tubercle bacilli might be worked out by a sustained attack. Killing *in vitro,* however, is slower than that reported for some other pathogens.[6] Also, the practical success of the scheme will, at best, depend upon actual maintenance of effective glycol vapor concentrations in the vicinity of infectious bacilli. The rapid mastery of numerous difficult problems, both experimental and engineering in nature, merits, in my opinion, the allocation of large funds. The inspiration for this attack must be obvious to all bacteriologists, but the originators of the method are fully engaged on other problems, and for this reason any inquiries should be directed to myself.

Incidentally the possibility of an anti-tuberculosis vaccine of bacilli suspended in a glycol seems worth examination. Such a vaccine, if found effective, would have the advantages accruing from permanent freedom from contamination, low temperature killing, high dispersion and consequent relative ease of absorption in tissues, etc. This subject derives enhanced importance (a) from the frequent inacceptability or unavailability of living vaccines, such as BCG; (b) the enormous, rapidly approaching need in the post-war world; (c) the rather tardy appreciation of moderate degrees of immunity, by the rabbit protection test;[7] and (d) the consideration that protection against only the first of a series of minute subfatal infecting doses might often decide the whole outcome: Most investigators now accept the proposition that complete conquest of a primary infection imparts a moderately enhanced resistance, at least as great as that conferred by BCG.[3]

The similarity in structure between the glycols and glycerol,[8] a normal metabolite of many organisms, enlarges the horizon for "fooling" our pathogens.

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[1] E. Mayer and M. Dworski, *Am. Rev. Tuber.*, 26: 105, 1932.

[2] W. Wells and M. Lurie, *Am. Jour. Hyg.*, 34: (Sect. B) 21, 1941.

[3] R. G. Bloch *et al.*, *Am. Rev. Tuber.*, 37: 174, 1938 and *Am. Jour. Roent. and Rad. Ther.*, 49: 463, 1943.

[4] O. H. Robertson *et al.*, SCIENCE, 97: 51, 1942, and 495, 1943; 98: 479, 1943. Also *Jour. Exp. Med.*, 78: 387, 1943.

[5] Just as the sulfa drugs may help to cure tuberculosis by quelling secondary invaders, the glycols may become indispensable treatment in sanatoria, for attacking these agents while still in the air.

[6] Killing in air is being subjected to provisional tests. Bacilli in sputum droplets will obviously be in a different state of aggregation than the warty, coherent colonies somewhat incompletely broken up here. A thin film of mucus on air-borne bacteria has been found by Robertson to be favorable to their killing by glycols; the mucus presumably retains moisture, and therefore traps glycol.

[7] T. S. Potter, *Proc. Soc. Exp. Biol. and Med.*, 54: 145, 1943; *Jour. Am. Med. Asn.*, 124: 527, 1944. E. Opie *et al.*, *Jour. Exp. Med.*, 66: 761, 1937; *Am. Jour. Hyg.*, 29: (Sect. B) 155, 1939.

[8] C. H. Boissevain, *Proc. Soc. Exp. Biol. and Med.*, 54: 342, 1943. As to the penetrating power of glycols for bacteria, see also T. G. Randolph and R. F. Mikell, *Am. Rev. Tuber.*, 49: 109, 1944.

## SALMONELLA ISOLATED FROM HUMAN MESENTERIC LYMPH NODES

STUDIES have been made investigating Salmonella from pig's mesenteric lymph nodes, the papers of Hormaeche and Salsamendi,[1,2] Rubin,[3] Edwards, Brunner and Rubin[4] and Varela and Zozaya,[5] all

[1] *Arch. Urug. Med. Cir. Esp.*, 9: 665, 1936.

[2] *Ibid.*, 19: 375, 1939.

[3] *Jour. Bact.*, 40: 463, 1940.

[4] *Proc. Soc. Exp. Biol. and Med.*, 44: 395, 1940.

[5] *Rev. Inst. Salub. Enf. Trop.*, 2: 311, 1941.

these investigators identified various species of Salmonella. The present publication reports the results of an investigation of Salmonella cultured from the mesenteric lymph nodes of 171 persons dying of different maladies in the General Hospital of Mexico. D.F.

The technique employed in this study was the same as that utilized previously in our study of Salmonella obtained from pigs.[5]

We isolated four species of Salmonella of Group B, five species of Group C and one species of the Further Groups. Twenty-seven Salmonella were identified: *S. typhimurium* 5 times, *S. oranienburg* 6, *S. newport* 4, *S. muenchen* 4, *S. montevideo* 3, *S. reading* 1, *S. essen* 1, *S. chester* 1, *S. choleraesuis* 1 *and S. carrau* 1.

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# SCIENTIFIC BOOKS

## SINANTHROPUS PEKINENSIS

*The Skull of Sinanthropus Pekinensis: A comparative Study on a Primitive Hominid Skull.* FRANZ WEIDENREICH. *Paleontologia Sinica,* New Series D. No. 10, Whole Series No. 110. Published by the Geological Survey of China, 1943. New York. N. Y.: G. E. Stechert and Company. 278 pages of text. 38 tables. 93 plates. Index and Bibliography.

THIS massive and cumulative study of the human remains found near Peking is without doubt the most significant and important treatment of the whole subject of fossil man to appear in many decades. Perhaps indeed, because of its wealth of new information, it is the most significant comparative study yet to be made in the entire field of human paleontology. That the work has been brought forth in the midst of war, at a time when even the whereabouts of many of these precious fossils is unknown, is a tribute to American democracy and to the single-hearted devotion to science of Franz Weidenreich.

A pupil of the late Gustaf Schwalbe, whose broad interests ranged over many fields of biology, Dr. Weidenreich has been the carrier of a great tradition in a day when narrow specialization has too often impeded the course of science. That there are men in our universities who know his name as a histologist and not as a paleontologist, that anthropologists are often unaware of his contributions in other fields than their own, is both indicative of the breadth of his interests and the increasingly divergent paths of the anatomical sciences. It has been exactly forty years since Dr. Weidenreich wrote his first paper upon the development of the human chin, begun, characteristically, when he was actively engaged upon the study of the blood and its related organs. The present work is the product of decades of wide labor in seemingly remote fields, all of which have contributed to the scholarship brought finally into splendid focus in the writing of this volume.

The book begins with an account of the discoveries at Choukoutien, their state of preservation and an explanation of the methods employed in their restoration. Part II is devoted to an analysis both of the structural features of the crania in general, and the characters of the individual bones. The metrical as well as the morphological features receive detailed attention. Variations, both sexual and individual, are noted and the character of the *Sinanthropus* skull thoroughly established. Needless to say, its right to a position in the human phylogeny distinct from that of the Neanderthal type is thoroughly demonstrated. Part III of the monograph is devoted to a comparison of the Peking material with other fossil types such as *Homo soloensis, Pithecanthropus, Africanthropus,* the Australopithecines and other more recently discovered remains. Not content with his exhaustive treatment of *Sinanthropus,* Dr. Weidenreich details many new and pertinent observations upon these latter forms, as well. In conclusion, he ventures extended general comment upon the course of human evolution in the light of the evidence available to our generation.

The salient characters of *Sinanthropus* may be indicated in compressed form as follows: A completely erect posture, associated with a skull and face still in the grip of active evolution from an anthropoid to a human state. The skull is dolichocephalic averaging at 72.2. The great thickness of the cranial vault is a marked element in the low cranial capacity, which ranges from 915 cc to 1,225 cc with an average, for five skulls, of 1,043 cc. The supra-orbital ridges are massive and protrude beyond the infra-orbital border. The marked post-orbital constriction and small size of the brain case combine to produce a markedly phaenozygous skull. The nasal bridge is broad and short, the anterior nares wide and low. There is no nasal spine. The torus occipitalis "appears as a continuous broad bulge . . . which crosses the occipital bone in its entire breadth. . . . " The breadth of the skull is greatest at the biauricular plane, and, unlike the condition in modern man, decreases above that level. The skull is low and there is a pronounced sagittal crest