faintly perceptible lesion to extensive tissue destruction and death.

Cultivation in tissue culture and in the chorio-allantoic membranes of the chick has demonstrated that under such conditions embryonic tissue is peculiarly susceptible to a variety of infectious agents, particularly filterable viruses. That a similar situation exists with respect to the mammalian fetus *in utero* may be inferred from our studies. Certainly the susceptibility of the guinea pig fetus may exceed that of the postnatal representative of the same species, as we have seen especially in connection with the vaccinia virus. It is reasonable to expect also that fetal reactions to infectious agents will be found in certain cases to differ not only in degree but also in kind. In these respects, then, the fetus may be said in effect to constitute a new experimental animal for bacteriologic procedures.

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THE ISOLATION FROM COTTONSEED OIL OF AN ALCOHOL RESEMBLING ALPHA TOCOPHEROL FROM WHEAT-GERM OIL

EVANS, Emerson and Emerson have reported the isolation from wheat-germ oil of an alcohol, alpha tocopherol, having the properties of vitamin E.[1]

The same procedure has been followed in the preparation of the corresponding alcohol from cottonseed oil. Olcott[2] has demonstrated that a biologically potent concentrate could be prepared from cottonseed oil. Although this oil has only 0.7 per cent. non-saponifiable matter, as compared with 5.0 per cent. for wheat-germ oil, the commercial production of cottonseed oil makes it a readily available source material.

Four allophanates were isolated:

(1) m.p. 240°—regenerated alcohol biologically inactive as vitamin E.
(2) m.p. 158°–160°—regenerated alcohol, biologically active, believed to be identical with alpha tocopherol.
(3) m.p. 134°–135°—regenerated alcohol biologically active. Further investigation to be made.
(4) m.p. 80°—regenerated alcohol biologically inactive.

The 158°–160° allophanates from cottonseed oil and wheat-germ oil appear to be identical for the following reasons: (1) The two compounds have the same melting point; (2) There is no depression in mixed melting points; (3) Both compounds exhibit a maximum absorption in the ultra-violet between 2,900 and 3,000 Ångstrom units; (4) The alcohols regenerated from the two allophanates show similar biological activity.

An attempt is being made to isolate one or more of these compounds from a lettuce-oil concentrate.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A FURTHER IMPROVED PROSPECTING PICK

BROWN described[1] an improved prospecting pick as ". . . a perfect tool of the kind, of drop forged highest grade 85 carbon tool steel, with a perfect eye extended so as to secure the full purchase power of the handle. . . ." The writer thoroughly tested one of these picks on various formations in the Blue Ridge and Massanutten mountains in Virginia in the summer of 1932. We agree with Brown that the pick has good dimensions and balance, and that it is a serviceable tool. It may be all that is desired for certain kinds of work, but "perfect" is a descriptive term which should be rarely used.

We believe we have improved upon this perfect tool by applying a relatively small amount of a very hard alloy of cobalt-chromium-tungsten,[2] which serves as the cutting or digging edge for both the spatula and pointed end of the pick. On the point of the pick the alloy was applied only to the outer triangular face, the one opposite the handle. On the spatula end only the outer face was treated, and here the hard-facing material was carried to the chisel point. The location of the hard-facing material on the ends of the pick in this fashion resulted in a saving of material—approximate thickness 1/16 inch—and also made the

[1] H. M. Evans, O. H. Emerson and G. A. Emerson, *Jour. Biol. Chem.*, 113: 319, 1936.

[1] B. Brown, SCIENCE, 75: 291, 1932.

[2] H. S. Olcott, *Jour. Biol. Chem.*, 107: 471, 1934.

[2] Haynes Stellite is the trade name applied to an alloy of cobalt-chromium-tungsten. One pick was very kindly modified, as described, by the Haynes Stellite Company, Kokomo, Indiana.

tool self-sharpening. This method of applying hard-facing material to but one face is said[3] to have worked very well with other digging parts, such as power shovel teeth and plowshares.

We decided upon simulated rather than actual field experiments in order that we might perform as nearly as possible exactly the same routine with the two picks, since it can readily be appreciated that manual digging might easily have resulted in serious errors in a comparative study of the wearing qualities of a modified and an unmodified Brown pick.

A hole was bored through an extension of each pick handle 36 inches from the pick end and a round iron rod of slightly smaller diameter passed through the holes and securely fastened to supports in such manner that the picks could only move up and down. The picks could then be lifted and allowed to fall freely through equal and controlled distances upon selected objects. The lifting and release of the picks was secured by the revolution of two eccentrics of the same size fastened to an axle which was geared to a one-fourth horsepower motor. The end of the pick handle farthest removed from the head was depressed as the eccentric was revolved by the motor and the pick elevated, then suddenly released as the eccentric continued its revolution, and as soon as one pick was released for its downward stroke the other was quickly elevated. Speed-reducing gears were introduced between the motor and the revolving shaft, thereby regulating the number of strokes delivered by each pick to twenty-six per minute. The length of arc through which the pick points rose and fell was approximately seven inches. A counter was attached to the shaft and each complete revolution of the shaft, and therefore the number of strokes delivered by each pick was automatically recorded.[4]

A total of eight thousand strokes were delivered by each end of each pick, distributed as follows: Alberene (a soft stone)—1,000 strokes; old brick—1,000; sandstone—1,000; concrete I (interior of a broken block)—1,000; concrete II (surface of U. S. Highway I)—3,000; polished, fine-grained white marble—1,000. The digging operation was interrupted after each five hundred strokes and the specimen turned so that each pick now dug where the other had been digging.

Neither pick showed much sign of wear after impact upon alberene and old brick, but beginning with sandstone a decided difference in the two picks was observed. The pointed end of the original Brown pick quickly became blunted and rounded off so that its effectiveness was materially lost and could only be restored by resharpening. At the same time and under the same working conditions the hard-faced pick became self-sharpening, the alloy showed no evidence of wearing and only the steel undercoat wore away. The results were even more noticeable at the spatula end. Since this is relatively thin for some distance, the alloy applied to the outer face composed a relatively larger cross-section than at the pointed end. Even very slight wearing away of the steel left a wear-resisting knife edge which was effective in digging very hard materials, such as marble and concrete, although a slight loss of alloy by chipping resulted. The unmodified steel spatula was badly bruised and roughened by sandstone, concrete and marble. Practically no effective digging was done on the two latter materials by the original steel pick.

It is the conclusion of the writer that the usefulness and effective life of this valuable tool can be materially increased by the application of Haynes Stellite[2] or some similar hard-facing alloy. These improved picks are not on the market. Perhaps it should be noted that the application of this alloy requires the services of a good welding operator. In addition, the alloy is too hard for machining and must be finished by grinding.

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[3] *Oxy-Acetylene Tips*, 6: 58, 1928.

[4] The general idea of the testing machine was described to Mr. J. M. Holeman and Mr. J. B. Weems, Jr., students at Randolph-Macon College. The writer expresses his appreciation of the time and efforts expended by them in designing and constructing it.

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