corded. By making the hot strip an arm of a wheatstone bridge arrangement, the temperature of the hot surface could be kept very constant through the decomposition test. The temperature setting was made from a calibration curve obtained from the resistance of the bridge settings and temperature of the surfaces, as determined by an optical pyrometer.

From the time for one half of the NH_3 to decompose on the surface for various temperatures the value of E in Arrhenius equation—rate of chemical change = $Ae^{-\frac{E}{RT}}$ was determined. E is the observed heat of activation determined from the slope of the straight line for which the abscissa is the reciprocal of the absolute temperature and the ordinate is the logarithm of the time for one half of the NH_3 to decompose. The resulting value of E has been determined from a 200 degree change in temperature, for temperatures between 475° to 750° C. depending upon the activity of the catalyst. From the nature of the reaction, and relatively small effects of the products of the reaction on the initial rate of decomposition, E may not be far from the true heat of activation or the measure of the molecular stability on the surface.

The results of these tests give values of E for the various catalysts from 38,000 to 42,000 calories per gram molecule, where the difference in catalytic activity of the various mixtures for a given temperature was as much as eighteen fold, as measured by the rate of the decomposition of NH_3.

It would seem, then, that the effect of a promoter or poison on the catalysis is to increase or decrease respectively the active surface or parts of the surface where decomposition takes place.

These results on the effect of a promoter or poison are in agreement with the idea of an extension of the active surface arrived at from experiments on the synthesis of NH_3.

The more active catalysts for the decomposition were also the best catalysts for the synthesis; likewise the poor or poisoned catalysts for the synthesis were found to be relatively poor for the decomposition.

Thus from these experiments we may conclude:

(1) That the primary effect of promoters on the iron catalysts is to increase the number of atoms upon which decomposition takes place.

(2) That the effects of heat treatment and poisoning on the catalyst is to decrease the number of atoms upon which decomposition takes place.

(3) That neither poisoning, heat treatment nor promoter action sufficiently alters the quality or nature of the atoms upon which the reaction takes place to cause an appreciable change in E, the heat of activation.

It is also interesting to note that if further experiments now in progress in the laboratory should confirm our belief that this 40,000 calories represents closely the true heat of activation for the decomposition of NH_3 on the iron catalyst, and that our value corresponds to the 39,000 calories found by Hinshelwood for the heat of activation for the decomposition of NH_3 on tungsten, and to the true heat of activation of NH_3 on platinum calculated by H. S. Taylor to be not less than 43,000, it would indicate that the true heat of activation may be a function only of the reacting gas and not of the catalyst present.

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A CRITICAL FACTOR IN THE EXISTENCE OF SOUTHWESTERN GAME BIRDS

COMPLAINT is continually made, on the part of both sportsmen and bird lovers, that despite all sorts of protective measures the wild quail in many districts of California are disappearing. Even in localities which have been set aside under public or private auspices as game refuges, and where prohibition of shooting is enforced, this diminishment in the numbers of quail continues to be reported.

Sportsmen are prone to ascribe the disappearance of game birds, where living conditions otherwise remain seemingly favorable, to the activities of so-called "vermin" of various kinds, giving little weight to the fact that in most parts of the country said "vermin" (hawks, owls, foxes, wildcats, etc.) have also become greatly depleted since the time when the original balance prevailed.

In casting about for some cause to hold responsible for the diminishment noted in such birds as the California quail, the student of natural history may properly proceed to check off the various factors known by him to bear importantly upon the existence of the species in question, one by one, and see what may be left. On certain brush-land areas in southern California, familiar to the writer now and thirty years ago, I am quite sure of the following conditions: (a) The food supply remains, in so far as I can see, in both kind and amount about the same; (b) shelter, that is, "cover," is of quite the same character and quantity as formerly; (c) natural enemies are most certainly fewer in individual numbers and hence levy less of a draft on the quail population than formerly; (d) hunting by man has in large measure been done away with on the particular territories in question.

Sportsmen and some biologists have stressed the probability of some disease having invaded the quail population. Upon this question I have nothing worth

serious consideration to offer one way or the other, save to point out the opportunity afforded for infection by domestic birds of drinking places accessible on country farms to wild game. However, my present inclination is to minimize the chances of this sort of factor entering into the present problem.

Then what critical factor *does* remain, to account for the marked decrease of the quail, even where general conditions remain altogether favorable?

I originally got the idea set forth in the following paragraphs from a sportsman long resident in Marin County, north of San Francisco Bay. It involves a factor active chiefly, but nevertheless vitally, in a very short segment of the life cycle of our quail. Briefly, a brood of newly hatched quail must find itself within walking distance (walking distance, be it emphasized, for the *little* quail) of water to drink by them, within a few hours of hatching. Anticipating this need, the old quail seek nesting sites accordingly. For without water the young are doomed to perish, *if* time of hatching happens to fall within a rainless or dewless period of weather. Failing to find such a propitious site, the nesting of a given pair of quail is a failure for that season.

Throughout the southwestern United States the thing of very greatest economic demand by the rapidly increasing human population is, not land, not minerals, not timber, but *water*. Every surface trickle, in every foothill ravine, which will yield water at the close of the rainy season, usually in April, and throughout the long late spring and summer dry season, is being tapped. At first the surface water is led off by pipe line to the thirsty ranch below. But a next step quickly follows: The seepage is tapped underground, a tunnel being driven in, and the water is drained from the porous rock or bed of sand below the surface. Then the mouth of the tunnel is screened, for the very purpose of keeping out animals of all sorts (so as to prevent "contamination"). In other words, the natural water supply, under original conditions provided at the surface, and accessible to the water-dependent wild animal life in the vicinity, has disappeared. It is only available, at best, in the very near vicinity of some human habitation far below, to which the pipe line leads, but where house cats, dogs and human beings prevent safe approach by quail. Not only for the thirsty youngsters but for the adult quail the original watering place has vanished.

There is, I believe, a critical distance, which, rain or dew failing, is the absolute limit a quail's nest may be located from safely accessible water and result in a matured brood. I estimate, from an accumulation of impressions (I grant) of my own, that maximum distance to be 400 yards. *If* a pair of quail can not find suitable cover and safety for its nest within that distance from water which will be accessible by the newly hatched young on foot, either the attempt is abandoned or that nesting is destined to failure. The common observation that few quail are raised in years of severe drouth supports this idea.

Immediate accessibility to water under conditions of safety, on the part of the little quail before they acquire wing power which will enable them to go long distances between forage grounds and possible drinking places, is then, I think, the prerequisite to maintenance of our quail and certain other upland game birds, even where all the other critical factors are favorable. And that factor of water supply, in the breeding season of the quail, is the one which, under the stress of human population growth, is becoming more and more the determining one. Properly safeguarded watering places are becoming fewer and fewer, with the inevitable result that large tracts of foothill brush-land otherwise suitable for the support of an abundant quail population come to lie untenanted by these esthetically attractive and recreationally valuable game birds.

The water supply available in the dry season is a factor delimiting not only human but certain other vertebrate populations in the arid southwest.

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SOCIETIES AND ACADEMIES

THE FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY

THE Federation of American Societies for Experimental Biology in conjunction with four other societies, namely the American Association of Pathologists and Bacteriologists, American Association of Immunologists, American Association for Cancer Research and the International Association of Medical Museums, held the annual meeting at the University of Rochester and Strong Memorial Hospital from April 14 to 16, 1927. It is the first time since 1918 that the Federation held its meetings at a time other than the Christmas holidays. The attendance was so high and the number of papers presented so numerous and of such character that most of those attending consider the spring meeting a great success. It was so successful that councils of the four societies constituting the Federation unanimously voted to continue the experiment for another year.

At the last joint session the Federation as a body formally extended to the Medical School of the Uni-