The Making of a Darwin

by President David Starr Jordan

Thirty-eight years ago it was my fortune as a beginner in science to attend the meeting of this association at Dubuque. The very contact with men of science, which this meeting gave, was a wealth of inspiration. To hear these men speak, to touch their hands, to meet them on the street, to ride with them to the fossil-bearing rocks, or the flower-carpeted prairie, for the moment at least to be counted of their number, all these meant wonderful things.

Of these men, let me speak primarily of the students of natural history, for then, and even yet, I know little of anything else. They were naturalists "of the old school," these workers of the early seventies. Louis Agassiz, dean of them all, was not at Dubuque, but I came to know him very soon after. There was Asa Gray. I heard at Dubuque some Harvard man say, "There goes Asa Gray. If he should say black was white, I should see it looking whitish." There was Shaler, the many-sided, every side altogether charming; and Spencer F. Baird, the father of cooperative science, the science at the Capitol at Washington. There was Fred Putnam, the ever-present veteran, a veteran even in his youth. There was Joe Le Conte, ever clear-headed and ever lovable. There was Newberry and Leslie and Gill and Allen and Swallow and Leidy and Calvin and Marsh and Coues, Wilder with his shark brains, and Scudder with his butterflies, and I know not what others, the great names of thirty years ago, names which we honor to-day. These men of the old school were lovers of nature. They knew nature, as a whole, rather than as a fragment or a succession of fragments. They were not made in Germany nor anywhere else, and their work was done because they loved it, because the impulse within would not let them do otherwise than work, and their training, partly their own, partly responsible to their source of inspiration, was made to fit their own purposes. . . . Nothing could head them off and they took orders from no one as to what they should do, or what they should reach as conclusions. They did not work for a career—many of them found none—but for the love of work. They were filled with a rampant exuberant individuality which took them wherever they pleased to go. They followed no set fashions in biology. Such methods as they had were their own, wrought out by their own strength. They were dependent on neither libraries nor equipment, though they struggled for both. Not facilities for work, but endeavor to work, if need be without facilities, gave them strength, and their strength was as the strength of ten.

For this reason, each typical man of this sort had Darwin walking with him. He became the center of a school of natural history, a rallying point for younger men who sought from him, not his methods, nor his conclusions, but his zeal, his enthusiasm, his "fanaticism for veracity," his love for nature . . .

Contact with great minds is not so common to-day as it was when the men of the old school were the leaders of the new. The enthusiasm of struggle, the flash of originality, grows more rare as our educational machinery becomes more perfect. If our present system fails, it is in the lack of personal contact and personal inspiration. If we can not create new Darwins, the raw material being found, it is because they can not walk with Henslow. Henslow is somewhere else, perchance in some government bureau of science, or if he is present he has too much on his mind to be a good walker. We do not value him enough to make him free. . . .

The atmosphere of a great teacher raises lesser men to his standard. It perpetuates the breed. It was not books nor apparatus that made Döllinger or Agassiz or Brooks successively centers, each of a school of research. It was the contagion of devotion, the joy of getting at the heart of things, the love of nature, the love of truth. Sometimes, in our wealth of educational opportunity, we long for the time when, as of old, the student had the master all to himself, the master unperplexed by duties of administration not called hither and thither by the duties of his station, but giving himself, his enthusiasm, his zeal and his individuality, to the student, not teaching books, but how to make books our servants. . . .

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The Chemist and the Community

On April 18 of this year there occurred at San Francisco a vast catastrophe as the result of which more than 1,000 people are said to have lost their lives while 250,000 were rendered homeless in the midst of a conflagration involving an area of six square miles and a property loss of at least $300,000,000. On April 19 there was run over and killed in the streets of Paris a simple, unassuming, absent-minded man. The Boston *Herald* in an editorial comment upon the two events said that it might well be questioned whether of the two the accident in Paris did not in its broad relation to the welfare of mankind constitute the greater calamity. This was an amazing thing to say of the death of any man, even of one so preeminent in attainment as Professor Curie. Let us consider why it was said and upon what basis it may, if at all, be justified. It was said in tacit recognition of the fact that the quality of intellectual leadership is one of the rarest and most precious possessions of our race and that the world can better afford to lose a city or a province than one of its great investigators, philosophers or teachers. One pregnant thought, one flash on insight from a master mind, has often done more for the advancement of mankind than all the toil which built the pyramids. . . .

The chemist has another and more general claim upon the community by reason of the intellectual interest which his researches add to life. Moissan extends the range of our activities to the highest temperature of the electric furnace, and we produce within our laboratories the conditions obtaining in the sun. Dewar brings us within a few degrees of the absolute zero. Bunsen and Kirchoff teach us the composition of the stars. Avogadro and Ampère picture to us the mechanism of gases. Dalton supplies a hypothesis which for almost a century suffices to explain the constitution of matter and the course of chemical change. Curie opens out new vistas in which the old thought is seen in new relations, which give to the universe, as we have known it, entirely new aspects. . . .

. . . The chemist from the very nature of his work and training should be the unswerving enemy of graft in every form. He should not be content with a mere passive resistance and a merely personal honesty, but should take an active and aggressive part in the fight against corruption and frauds, whether these involve sea-water gold, salted mines, corporation mismanagement or politics. He should more frequently be found on school boards and boards of health and special commissions, and I venture even to suggest that chemical societies should far more often act as a body or through committees to expose abuses or battle for their remedy. . . .

Arthur D. Little

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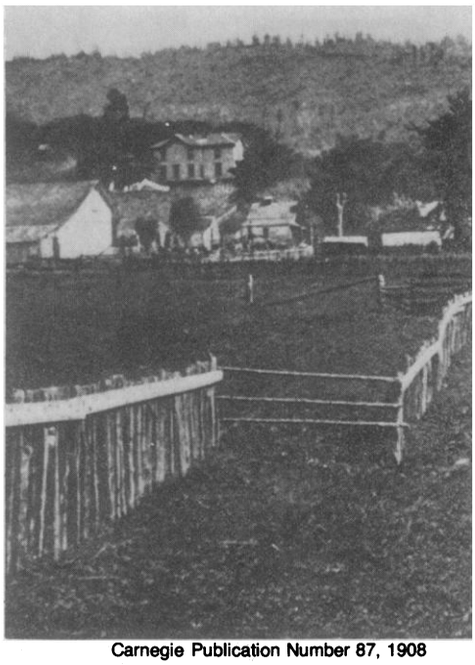
The California Earthquake

The earthquake of the eighteenth of April, 1906, was due to [relative motion of two segments of the earth]. The . . . rift upon which the movement . . . took place . . . extends certainly from the mouth of Alder Creek near Point Arena to the vicinity of San Juan in San Benito County, a distance of about 185 miles. The destruction at Petrolia and Ferndale in Humboldt County indicates that the movement on the rift extended at least as far as Cape Mendocino[.] . . . Adding the inferred extension of the movement to its observed extent gives us a total length of about three hundred miles. . . . Along the 185 miles of this rift where movement has actually been observed the displacement has been chiefly horizontal on a nearly vertical plane. . . . The surface soil presents a continuous furrow, generally several feet wide with transverse cracks[.] . . . All fences, roads, stream courses, pipe lines, dams, conduits and property lines which cross the rift are dislocated. The amount of dislocation varies. . . . A . . . common measurement is eight to ten feet . . . while in one case a roadway was found to have been differentially moved twenty feet. . . .

The destructive effects of the earthquake are in the main distributed with reference to the line of rift. The exact limits of the area of destruction have not yet been mapped, but it is known to extend out about twenty-five or possibly thirty miles on either side of the rift. . . .

Within the area of destructive effects approximately four hundred by fifty miles in extent the intensity varied greatly. There was a maximum immediately on the rift line. Water pipes, conduits and bridges crossing this line were rent asunder. Trees were uprooted and thrown to the ground in large numbers. Some trees were snapped off, leaving their stumps standing, and others were split from the roots up. Buildings and other structures were in general violently thrown and otherwise wrecked, though some escaped with but slight damage. Fissures opened in the earth and closed again, and in one case reported a cow was engulfed. A second line of maximum destruction lies along the floor of the valley system of which the Bay of San Francisco is the most notable feature, and particularly in the Santa Rosa and Santa Clara valleys. Santa Rosa, situated twenty miles from the rift, was the most severely shaken town in the state and suffered the greatest disaster relatively to this population and extent. . . . San José, situated thirteen miles, and Agnews, about twelve miles from the rift, are next in the order of severity. Stanford University, seven miles from the rift, is probably to be placed in the same category. All of these places are situated on the valley floor and are underlain to a considerable depth by loose or but slightly coherent geological formations, and their position strongly suggests that the earth waves as propagated by such formations are much more destructive than the waves which are propagated by the firmer and highly elastic rocks of the adjoining hill lands. . . .



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One of the lessons of the earthquake which seems peculiarly impressive is the necessity for studying carefully the selection of proposed costly public buildings where large numbers of people are likely to be congregated. In so far as possible such sites should be selected on slopes upon which sound rock foundation can be reached. It is probably in large measure due to the fact of their having such a rock foundation that the buildings of the State University, at Berkeley, escaped practically uninjured. . . .

A. C. Lawson and A. O. Leuschner

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A Message to Legislators from a President of the University of Wisconsin

Inaugural Address of President Charles Richard Van Hise

. . . But while the professor performs important service outside the university, his greatest service is his own creative work and the production of new scholars in the laboratory and seminary. I unhesitatingly assert that there is no investigation of matter or force or mind to-day in progress, but to-morrow may become of inestimable practical value. This could be illustrated by various investigations which have been made here. It is easy to show that the discoveries at the University of Wisconsin bring vastly more wealth to the state each year than the entire expenditure of the institution, but to tell of them might seem like placing too great emphasis upon our own achievements, and I, therefore, turn elsewhere for illustrations.

Scarcely more than a century since, Franklin began studies upon the nature of lightning. Later the character of electrical force was during many years investigated with remarkable power by Faraday. If, during these studies, some one had said: 'Of what practical value can be the discoveries of Franklin and Faraday?' no one could have given the answer. Had this work been paid for by the state it would have been easy to show to the legislature that such a foolish waste of money was wholly unwarranted. But out of the discoveries of Franklin and Faraday, and those who followed them, has come one of the greatest material advances that the world has known. . . .

A striking case of the profound service of the investigator is furnished by the studies of Pasteur and Koch. If, a half century since, a legislator in France had wished to be humorous at the expense of the scientist, what better object of derision could he have found than his countryman, Pasteur, who was looking through a microscope at the minute forms of life, studying the nature and transformations of yeast and microbes? And yet, from the studies of Pasteur and Koch, and their successors, have sprung the most beneficent discoveries which it has been the lot of man to bestow upon his fellow men. The plague and cholera and yellow fever are controlled; the word diphtheria no longer whitens the cheek of the parent; even tuberculosis is less dreaded and may soon be conquered; aseptic surgery performs marvelous operations which, a few years ago, would have been pronounced impossible. . . .

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