words, "not merely with punitive views, but also to show us what mighty effects he can produce by instruments so insignificant, thus calling on us to glorify his power, wisdom and goodness."

Contrast with this view the view of Professor Bailey, in one of his charming essays in the volume entitled 'The Survival of the Unlike:' "We are now prepared to admit that this whole question of enemy and friend is a relative one, and does not depend upon right and wrong, but simply upon our own relationships to the given animals and plants. An insect which eats our potatoes is an enemy because we want the potatoes too; the insect has as much right to the potatoes as we have. He is pressed by the common necessity of maintaining himself, and there is every evidence that the potato was made as much for the insect as for the human kind. Dame Nature is quite as much interested in the insect as in man. 'What a pretty bug!' she exclaims; 'send him over to Smith's potato patch.' But a bug which eats this insect is beneficial; that is, he is beneficial to man, not to the insect. Thus everything in nature is a benefit to something and an injury to something; and every time that conditions of life are modified the relationships readjust themselves."

In these words Bailey, with his accustomed felicity, has expressed the situation admirably. Man is but one of the forms of life struggling for existence, at continual warfare with surrounding forms; but by virtue of his surpassing intelligence—itself as gradually evolved as have been the physical characteristics of any given species—he has overrun the earth, has accommodated himself to the most unnatural environments; he has dominated all other species in nature; he has turned to his own uses and encouraged or hastened the evolution of species useful to him or of useful qualities in such species; he has wiped out of existence certain inimical forms, and is gaining the control of others. He is the dominant type, and types whose existence and methods of life are opposed to his interests are being pushed to the wall. It is the culmination of a history which has many times repeated itself in past ages. The struggle of other forms of life to accommodate themselves to the conditions brought about by the rapid development of this dominant type is one the most interesting fields of study open to the biologist to-day. It would seem as if, in man's efforts to make the face of the earth his own, all the complicated elements of life were arrayed against him, and the great and ultimate result of the labor of the biologist in his study of the relations of the different forms of life and the laws which govern their development will be to bring about the absolute control of all other life by man. Thus it is not only the economic worker who looks for immediate results of a practical kind from his labor—the scientific agriculturist, the horticulturist, the economic zoologist, the medical bacteriologist—who should command the respect of even the practical-minded man, but the biologist in whatever field, however restricted it may be, whether he is working towards the understanding of broad principles and general laws, or whether in some narrow corner of research, he is accumulating material which will help ultimately to lead to wider understandings—all are working helpfully and practically towards the perfect well-being of the human race.

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ANTI-FRICTION ALLOYS.

M. G. CHARPY, the well-known investigator in this field, publishes in the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, for June, 1898, an extensive paper on the '*Travaux de la Commission des Alliages*,' of which the following are some of the main points:

The purpose of the investigation was largely that of finding a way of applying to alloys for bearings the tests previously deduced respecting relations of fusibility and other properties. General experience has shown that white alloys, customarily used for bearings in machinery, are much less frequently overheated than those made, as previously common, of bronze, while they are found also to reduce friction something like 20 per cent. In some instances the reported accidents with the two classes of metal are but $2\frac{1}{2}$ with the white metal as compared with 100 with the yellow in ordinary railroad work. Their wear is also but about 0.4 that of the bronze. So long, however, as a layer of oil remains in effective depth, on the rubbing surface, the coefficient of friction is substantially the same with all bearing metals. Flooded journals give immunity from friction, safety from heating and wear, and independence of the nature of the rubbing metals, except so far as their conductivity affects the removal of heat developed by friction.

Charpy gives an extensive table of the composition of various anti-friction alloys as reported by the authorities, including substantially all those reported by Dudley, Ledebur and Thurston. His own investigations are upon alloys of lead and antimony; of lead, tin and bismuth; of tin, copper and antimony; of lead, copper and antimony; of zinc, tin and antimony, and of copper, tin and lead; all of which are studied under compression and wear, and micrographically. Admirable prints are given of the micrographic development, and the 'stress-strain' diagrams, both for the binary and ternary alloys, are exhibited; the writer using the Thurston 'tri-axial' diagram, and the corresponding 'glyptic' representation in the solid, to illustrate his work.* The paper abounds in most interesting and helpful illustrations of these kinds.

He concludes substantially as follows:

(1) All these alloys, when fitted for use as anti-friction metal, exhibit the same general characteristics. They are made up of hard particles set in a soft and plastic alloy. The load is taken by the hard metal, while the friction is reduced by the comparatively low coefficient of friction and by the power which is given by the soft alloy of adapting the loaded surface to the position of the journal and to its deformations. The ternary alloys are thought better than the binary.

(2) The limits of practically useful alloys and mixtures are determined by this method of investigation and the best compositions are identified.

(3) The processes adopted are mainly graphic and micrographic, to ascertain whether the quality is suitable and the composition such as has been found desirable, and compressive tests to ascertain whether it has the needed power of resisting pressure, without serious deformation under ordinary conditions of use. 'Cooling curves' were found very helpful.

(4) Alloys of lead and antimony should contain between 15 and 25 per cent. antimony. Those containing more of this constituent are too hard and those containing more lead are too soft; the one will lead to brittleness and fracture, the other to crushing and cutting.

(5) The copper-tin-antimony alloy of best proportions is considered to be that containing Cu. 5.55; Sn. 83.33 and Sb. 11.11 by weight. It is strong and tough, corresponding with the alloys empirically selected for railroad journals by some railway authorities.

(6) The lead-tin-antimony alloys should contain between 15 and 90 per cent. tin, and

* See Transactions Am. Soc. Mech. Engrs., No. DCCLXXVII., Vol. XIX., 1898. Sauveur, in this country, has most extensively employed these methods of micrography in the work of his laboratory.

not above 15 or 18 per cent. of antimony. An alloy employed for metallic packing contains Pb. 80; Sn. 12; Sb. 8.

(7) The copper-lead-antimony alloy should not contain above 10 per cent. copper. One tested alloy of good character is Cu. 10; Sb. 25; Pb. 65. It has been used successfully on railway axles.

(8) The copper-tin-lead alloys are the usual bronzes of anti-friction metal makers. The lead is probably a necessary constituent for highest efficiency. They contain from 75 to 90 per cent. copper; 8 to 12.5 per cent. tin, and 0 to 15 per cent. lead. Fluxing with arsenic or phosphorus is usually advantageous, the amount found in such alloy averaging about 0.8 per cent.

R. H. T.

ANNUAL MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION.

THE American Psychological Association held its seventh annual meeting at Columbia University, New York City, on December 28–30, 1898. Over fifty members were in attendance at the various sessions, this being the largest number at any meeting since the organization of the Association.

Owing to the number offered, the sessions were entirely given up to the reading and discussion of papers, but the members were present at the discussion before the American Society of Naturalists in 'Advances in Methods of Teaching,' being represented in the discussion by the President of the Association, Professor Münsterberg. Many of the members also attended the reception given by Professor and Mrs. Henry F. Osborn to the Affiliated Societies on Wednesday evening, and were present at the dinner of the Societies at the Hotel Savoy on Thursday evening. At the business meeting Professor John Dewey, of the University of Chicago, was elected President for the ensuing year; Dr. Livingston Farrand, of Columbia University, Secretary and Treasurer; and Professors J. McK. Cattell, of Columbia University, and H. N. Gardiner, of Smith College, members of the Council.

Besides other business transacted, there was appointed, on motion of Professor J. M. Baldwin, a Standing Committee of Psychological and Philosophical Terminology, consisting of Professors Münsterberg, Cattell, Sanford, Creighton, Royce, Minot and Baldwin. The duties of this committee are to recommend from time to time new terms and choice of alternative terms in psychology and philosophy; to recommend foreign equivalents for translation both into English and into foreign languages, and to keep the Association informed as to the growth of terminology in other departments, especially in neurology.

Professor J. McK. Cattell, Chairman of the Committee on Physical and Mental Tests, reported on the work of the Committee during the year and described the progress in this field in the different laboratories.

Professor Münsterberg, who presided at the meeting read his presidential address on Wednesday afternoon, taking as his subject 'Psychology and History.' Professor Münsterberg argued that the psychological and historical views of human life are necessarily in conflict; for the one the personality is a complex of elements and causally determined; for the other it is a unity and free. He held that claims of recent writers that psychology and history are two coordinated ways of dealing with the same problem are untenable; that the difference between the two is not methodological, but ontological. The materials are different. The material of psychology consists of objects which as such can be described and explained; the material of history consists of subjective will acts which can merely be interpreted and appreciated. Our interest in the two is different. The investigation