of the Sacramento River, and is now making a resurvey in the vicinity of Golden Gate; various acting assistants in the coast and geodetic survey are preparing to take the field the first of June, to continue the work of furnishing points and data to different state surveys, Professor Buchanan going to Tennessee, Professor Campbell to Indiana, Professors Barnard and Merriman to Pennsylvania. Chart No. 2, from the mouth of St. John's River to Jacksonville, Fla., embracing the latest hydrographic work, and the improvements of the jetties at the mouth of St. John's, is now ready for distribution to agents.

— At a meeting of the Royal geographical society on May 11, a paper was read by Prof. W. M. Ramsay on 'Roman roads and English railways in Anatolia.' Before the reading of the paper, the chairman announced that royal medals had been awarded to Major A. W. Greely, commander of the U. S. Arctic expedition of 1881–84, for having so considerably added to our knowledge of the shores of the Polar Sea and the interior of Grinnell Land, and for the narrative of the expedition which he has just given to the world; and to Signor Guido Cora, for his important services as a writer and cartographer in advancing geographical knowledge, promoting the study of geography, and defining its position as a science. Professor Ramsay's paper detailed the results of his researches into the system of Roman roads in Anatolia, and the conclusions to be drawn from those researches as to the considerations which influenced the Romans in the formation of those roads.

— Another comet in Virgo was discovered Saturday morning, May 22, by Mr. Brooks. As determined by Professor Swift at the Warner observatory at ten o'clock Sunday evening, its position was, right ascension, 11h 51m 15s; declination, north 8° 55′ 15″. It has a slow motion south-east. It is very large, but faint. This discovery secures to Mr. Brooks the three first Warner prizes of the year.

— Commodore George E. Belknap has been detached from duty as superintendent of the naval observatory at Washington, and ordered to command the Mare Island navy-yard, California, about the middle of June. Lieutenant Bowman and Ensign Taylor have also been detached from the observatory. Commodore Belknap's successor has not been announced.

— The executive committee of the International institute of statistics met at Cologne on May 1, 2, 3, and 4. The members present were Sir Rawson W. Rawson (England), president; M. Levasseur (France), Herr Hofrath Neumann-Spallart (Austria), M. L. Bodio (Italy), and Mr. John B. Martin (England). It was decided that the meeting of the institute this year should be held at Rome, from Sept. 23 to Sept. 29. The programme was drawn up, and a list of subjects to be discussed adopted.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

A new museum pest.

IN a collection arranged to illustrate a course in paleontology at the Museum of comparative zoölogy, a new set of labels was introduced last year, which has since been very much injured by the attacks of an insect, Lepisma domestica, — the silver-fish, in popular language. The labels are similar in plan to those which are used in the paleontological department of the national museum. They are made of thick paper, heavily sized with starch, with headings, and a border-line printed in black ink. They are bent at a right angle in the middle. The specimen is set on the lower half, while the description of the same is written on the upturned portion, rendering it visible without the necessity of lifting the specimen, — a distinct advantage, especially for class-room use. There are about seven hundred labels in use, and all, at the time of examination, had been written within ten months; yet not a single one had wholly escaped from the attacks of Lepisma. Many were eaten enough to obliterate the writing, and riddle the paper with holes; and all gradations between slight and extensive injury exist. Paper trays in which the specimens are kept, and which apparently contain no sizing, are not at all eaten. The labels are eaten on all parts except underneath, where pressed against the paper tray by weight of the specimen. The parts covered with printer's or writing ink are eaten quite as much as those which are not, contrary to the observations of others cited below. Careful search in the early winter led to the discovery of perhaps half a dozen specimens of Lepisma, but none have been seen since.

I have seen labels written on various kinds of paper, in the same and other departments of the museum, eaten by Lepisma; also a photograph, wall-paper probably, and an old engraving in New York. In this last the white portions were most affected, but some parts closely covered with printer's ink were eaten.

I have made many inquiries from naturalists and others, concerning the destruction done by Lepisma; but to most it was new. The late Prof. C. E. Hamlin of the museum said he had seen paper eaten, and titles eaten off the backs of books, where they had been attached by starch paste, but was confident that unsized paper was never affected. Prof. R. P. Whitfield of the American museum said that he had known injuries to labels to have been committed by Lepisma. Prof. F. W. Putnam, of the Museum of archeology and ethnology, showed me many labels which had been eaten, or entirely reduced to powder, by Lepisma. Mr. S. Henshaw, of the Boston society of natural history museum, had known of injuries, and, enclosing Lepisma in a jar with paper, found that the insects eat large holes in it.

It is clear that Lepisma, if not a very common visitant to museums, is at least a dangerous one when it does appear, and it behooves naturalists to be on the lookout for it. Labels, of course, are a most essentially important thing, and it seems not

overcautious to say that some means should be taken to prevent their being destroyed by insect foes.

If labels should be dipped in an alcoholic solution of corrosive sublimate, it would doubtless render them perfectly safe from the attacks of Lepisma, and other insects as well. In poisoning dried plants to prevent the attack of insects, botanists use a solution of the strength of one ounce of corrosive sublimate to a quart of alcohol. The same, or a solution of double strength, would seem advisable for labels. If, after dipping, they are dried between sheets of blotting-paper under a weight, or in a letter-press, the labels will not curl, or be injured in any way. Corrosive sublimate, under the conditions of a cabinet, is a perfectly stable compound, and would retain its protecting-qualities for all time; whereas most insecticides have to be renewed occasionally, and would render themselves objectionable in one way or another by their presence. Labels may be treated with great rapidity if a large number are done at one time. Those already written on may be poisoned without affecting the ink; at least, such has been my experience.

Paper sized with lead might be proof against insects; and I have not seen any injuries done to labels sized with rosin, though a large number were in the cases where Lepisma committed its ravages.

Labels, after being written, could be coated over with water-glass (silicate of soda), which forms a hard, transparent glaze, and would surely be proof against insects; but it is objectionable, in that it takes a good deal of time to brush over each label after writing it, and, besides, the label curls somewhat in drying.

Professor Hagen has been told by ladies that their silk dresses, always black ones, had been destroyed by carpet-bugs, and has answered that they only attack wool, and has only lately learned that Lepisma did the damage. He also says that gold lettering on the backs of books, which is commonly done by putting gold on paste and burning it in, has been undermined by Lepisma.

When I first showed the labels to Prof. H. A. Hagen, seeking his advice, he was much puzzled, as he thought Lepisma could not have eaten them, and Anobium, the great library pest, does not like starch; in fact, he says it has been recommended to use such paste as is made of pure starch, in binding books, to avoid the latter.

Professor Hagen was much interested in this pest, new as such to him, and, looking up the literature of the subject, read a paper on it before the 'Thursday club.' Part of his delightful paper was published in the *Boston evening transcript* of March 13.

He very kindly wished me to write an account of what I had observed in regard to Lepisma, and to add from his manuscript the facts which he has gathered: they are contained in abstract in the following: —

Lepisma destructive to the labels is a true American insect, described by Professor Packard as L. domestica. There are half a dozen species in the United States. The principal one in Europe is L. saccharina, the small blue silver-fish. This insect is found in dark corners, and near provisions. In Europe it has always, but without proof, been considered as imported from America It has been known there for over two hundred years; but its existence cannot be traced before the discovery of America. The whole of its flexible body is covered with fine irridescent scales which have been used as delicate microscopical tests; and to these hairs it owes its common name of silver-fish.

Nearly six years ago, at a meeting of librarians in Boston, Professor Hagen read a paper on library pests. After a review of the literature then at command, he concluded that only two North American insects were to be considered very dangerous to books, — the white ant; and Anobium, a small beetle which is also injurious to old furniture. These additions to his communication have been published; but they contain only isolated cases, certainly nothing of general importance.

The earliest notice of the small European species is in R. Hooker's 'Micrographia,' a folio published in London in 1665, and containing an account of innumerable things examined under the microscope. It is still respected for the accuracy of the author's statements. He figures Lepisma, and calls it bookworm, and says it corrodes and eats holes in the leaves and covers of books. On Mr. Hooker's authority, Lepisma was reported as injuring books; but as Mr. Hooker apparently confounded destruction done by Anobium with that of Lepisma, and since during the next hundred years no damages due to the latter were observed, the observation was doubted; and Professor Herman of Strasburg, in his prize essay on library pests, declared, in 1774, that Lepisma was erroneously recorded as injurious to books. For this reason, Professor Hagen did not mention Lepisma in his communication on library pests; the more so, as again in the next hundred years no new observations had been recorded.

Soon after his communication, new proofs of the depredations of Lepisma were observed. Professor Westwood of Oxford showed at the Naturalists' association in 1879 a framed and glazed print, in which the plain paper was eaten, while the parts covered with printing-ink were untouched. He mentioned that the same fact had been observed in India, where government records had been injured in a similar way. Patrick Brown says, in his 'Natural history of Jamaica,' that L. saccharina is very common there, and extremely destructive to books and woollen clothing. This statement was reproduced by Linnaeus, but was later considered as unreliable. M. de Rossi writes, in 1884, that L. saccharina likes damp places. It destroyed paper-hangings in his house, muslin curtains were perforated, and living animals found near the holes; also insect-boxes, and wings of butterflies, have been damaged. Professor Liversidge, in Sydney, reports the same year that L. saccharina is very common in New South Wales. He says it does not do much harm to books, as it cannot get in between the leaves, but injured loose papers, maps, and labels. The loose edges of piles or bundles of letters suffered more than the interior. The same calamity is reported by Mr. H. Lucas, assistant in the museum of the Jardin des Plantes in Paris. He says L. saccharina destroys labels of white paper, but parts printed on with minium and oil remained untouched. Labels of starched paper were much injured, but only the white parts. When leaving the country in 1862, he put in a drawer various articles of starched clothing, and, returning after six weeks, found numerous holes in it, and Lepisma near by. Dr. Aube, in Paris, says that the black part of the backs of books has been nearly destroyed, probably by Lepisma. The well-known antiquary, Mr. Quaritch of London,

complained in 1870 of injuries done to books by Lepisma; and Mr. Lewis, after careful examination, stated, that, on account of parts of the bindings having been eaten, the books fell to pieces. He considered it impossible for Lepisma to bore holes in the books, which holes were probably made by Anobium. Mr. Morrill, head master of the Boston Latin school, has sent books at different times to Professor Hagen, which were injured by Lepisma, and specimens of the obnoxious insect as well. Professor Packard, in his guide, speaks of silk being eaten by Lepisma, which also devours paste, making holes in the leaves of books. Also Mr. Horne of London alluded to the damage done to silk garments in India by Lepisma. The insect doubtless attacks the silk for the stiffening-matter in it, but nevertheless destroys the fabric. Finally Mr. Adkin showed a species of Lepisma which damaged account-books kept in an iron safe in London.

After all these reliable facts, there is no doubt that Lepisma may become very destructive to maps, engravings, photographs, herbariums, and other things, if left undisturbed. The question, why has it not been observed long ago? may be answered by the fact that they run so swiftly that they are easily overlooked.

If we tabulate all the facts, we find directly that all damages, excepting to paper, have been inflicted on clothing, muslin curtains, etc., which were invariably starched, or finished with some stiffening size. I found a set of labels in the museum which had apparently been eaten by Lepisma, but which, on most careful tests being made, proved to contain no starch.

Lepisma is easily destroyed by insect-powder, which kills all that it reaches; and Professor Hagen recommends the same to be sprinkled about silk dresses, or the drawers and closets where such articles, or others likely to be attacked by Lepisma, are kept. He would cover the backs of valuable framed engravings with common, unsized paper, fastened with a paste mixed with insect-powder. All papers, where pressed closely together, are not reached by Lepisma, and in this way large numbers of accidents may be avoided; or, if they would be injured by pressure, they will be safe kept in simple pasteboard boxes, made to close perfectly, so that the little pest could not find an entrance.

ROBERT T. JACKSON.

[This obliteration of labels by insects, presumably by species of Lepisma, has long been a source of annoyance in the paleontological department of the Yale college museum. To remedy the evil, the labels have been, for some time past, prepared by soaking in a solution of corrosive sublimate or arseniate of potash.—ED.]

Evolution and the faith.

It seems almost a pity that a magazine with the splendid reputation that the *Century* possesses for the encouragement it has given in past years to our contemporaneous expounders of modern thought, should admit to its columns such a contribution as the one that appears in the May number, from Mr. T. T. Munger, bearing the above title.

Mr. Munger closes the essay in question by indicating "in a categorical way the lines upon which further study should be pursued" with respect to evolution.

The several lines laid down in this category are divided into two sections, which are, 1°, "the respects in which evolution, as a necessary process in natural and brute worlds, does not wholly apply to man;" and, 2°, the "contrasting phenomena of evolution under necessity, and evolution under freedom." The first section indicates ten lines for further research into the laws involved; and the second, six. It would occupy far too much space here to reproduce all of these in the words of our author; and especially is this unnecessary, as it is my sole object to endeavor to show the general fallacy that pervades them all.

It must be evident to every one of us that Mr. Munger's chief error lies in the fact, that, in drawing up these 'further lines for research,' he has kept only before his eyes an idealized man and an idealized brute. May I ask our author where that hard and fast line is to be drawn, where 'instinct yields to conscious intelligence'?

A good many years ago I availed myself of the opportunity extended to me on a number of occasions, to examine that mass of living humans which constituted a cargo that filled the hold of a slave ship in the West Indies; and many a time since have I had the privilege of studying some of the lowest types of the now-existing Indians in this country. If Mr. Munger has ever had the opportunities of observing the habits of such creatures in their native haunts, I doubt very much that he would be wholly prepared to say, that, among *all species of men*, "the struggle for existence [now] yields to a moral law of preservation, and is so reversed."

Are our researches to now cease with respect to these low types of brute-like men, of which whole races still inhabit various quarters of the globe? Take the Mojaves of this country, and some of the tribes of central Africa, or Asia, or the native Australians, and any number of examples from them will stand witness to violate nearly every axiom Mr. Munger lays down in his category in the *Century*. In reality, some of them fully carry out the popular notion of a 'connecting link;' and from a study of their physical and moral organizations, science, no doubt, has derived some of her most trustworthy data for the establishment of evolutionary laws. They have by no means 'become conscious of the Infinite One,' nor do they 'systematize knowledge and reason upon it;' or at least, as Mr. Munger says for the brute, 'except in a rudimentary and forecasting way.'

Perhaps the remaining 'lines for research' of our author's category, upon which I have no comment to pass, may be more pertinent to a far later stage of man's development than would hold good at this day. The laws of evolution are still in active operation about us on every hand, and they have by no means been suspended in man's case, as Mr. Munger would have us believe. It can be said of the highest and best types of men, that, as a class, they are but on the threshold of psychical and intellectual evolvement, while some of the lowest forms of the black men of Africa occupy a moral and mental plane but a few degrees above the one in which we find the corresponding attributes of some of those representatives of the animal kingdom that no doubt, in our author's zoölogy, would be classified among the brutes.

R. W. SHUFELDT.

Fort Wingate, N. Mex., May 18.