

And the political-economist knows that this means increase of national wealth, while the statesman sees in it enhanced national stability and power. Yet, by the natural method on which civilization advances, the conditions to this much-needed settlement can never be secured.

Notwithstanding this, I believe this end will yet be reached. The human race is rapidly outgrowing the natural or genetic method. There is another method, scarcely as yet recognized by the political-economists, but which is being more and more resorted to by enlightened men for overcoming such great physical obstacles to the attainment of clearly-perceived advantages. This is the method of foresight, or calculation. Individuals employ it for the attainment of both private and public ends. Capitalists combine, and lead civilization into regions it would otherwise never have penetrated. It is very probable that a gigantic irrigating company will some time be formed, which will, by degrees, accomplish more or less satisfactorily the desired object. But, in such case, great evils are likely to result,—evils analogous to those that have arisen from permitting great corporations to construct much-needed transcontinental lines of railway. An immense irrigation monopoly would inevitably grow up, which would largely neutralize the benefits derived from the project. Settlement would be impeded by excessive water-rates; and endless litigation, and conflicting legal decisions, would constantly deter population, and jeopardize industry.

A far better plan would undoubtedly be state action. If the territory of Montana possessed the means to undertake such a scheme, it could scarcely fail to prove highly remunerative at the end of a certain period. But here some such an obstacle exists as in the case of mere spontaneous settlement. Not until these tracts are already well-peopled will the territory possess the means of inducing settlement; and we have again a 'vicious circle,' which ends where it begins.

The only unobjectionable plan, as it seems to me, is *national* action. The nation is the largest of all capitalists, and, at the same time, has no tendencies towards monopoly. If we could obtain the same degree of collective foresight in the general government as exists in the average capitalist, nothing could be easier than for the United States, acting as a corporation that seeks only its own interest, not only to secure the particular end of which we are now speaking, but to develop its own resources, and increase its wealth and prosperity in num-

berless other directions, by the ordinary exercise of such foresight.

The present case seems to be one in which the nation has a special interest, rendering it peculiarly fitting that it should extend its aid. It is of the utmost importance as a matter of *national* security, and of immunity from dangers which no statesman can foresee, that the rapidly-growing west, with its peculiar interests, be cemented as speedily and firmly as possible to the east; and nothing can so effectually secure this end as to make the population of the entire Union an unbroken phalanx from the Atlantic to the Pacific.

LESTER F. WARD.

LAWSUITS AGAINST GRUBS AND GRASSHOPPERS.

EVERYBODY knows that migrations of grasshoppers were a hard plague in biblical times, and even before them. Ever since those remote centuries this plague has not ceased to disturb mankind, accompanied or followed by failure of crops, by famine and pestilence. Wherever these hideous guests arrived, the most persistent war has been waged against them, but it has always ended with the defeat of mankind. The consequences were the same as in all other defeats in those remote times. When men were helpless, the intervention of the law or the intervention of God was called upon to interfere, and to stop the ravaging intruders. The reasoning of the people was indeed rational, considering the low state of culture and education. The officers and representatives of the law, as well as the clergy, the natural interpreters between the people and God, were obliged to submit to the wishes of the helpless and therefore unruly people. It is to be supposed that both acted in good faith; nevertheless, we find sometimes indications of a more advanced intelligence, and it is evident that they have then submitted only because resistance was impossible. As such proceedings would have been too ridiculous and useless if not done in a seemingly lawful and imposing form, we find that by and by the development of laws against obnoxious creatures in the middle ages was perfected. A defender was given to the miscreant, as it was deemed lawful that he could not be judged and condemned without being heard and defended. According to the opinion of the old jurists, even to the devil a defender cannot be denied: therefore we find a number of curious law cases reported in those times. In the south of France, a pig which had killed a child was condemned and hanged. Some thieves were hanged, together with their dogs; and the *Lex Carolina* contains a number of paragraphs, not very fit to be repeated, which imposed the sentence of death on animals. Lawsuits against creatures obnoxious to men, and injuring their property, are often reported by the chroniclers, sometimes with a certain kind of

humor. Grasshoppers and grubs were the most frequent offenders.

Bartholomæus Chassanaeus, a jurist of repute in the old territory of Burgundy, proposed a course of proceedings proper for such a lawsuit, and its consequences, — the judgment of excommunication. He says, after written summonses are served, and after a judge is appointed, two advocates are to be chosen, — one for the people, the other for the grasshoppers. The first begins the case against the defendant, and concludes finally that the grasshoppers should be burnt. The other advocate objects, and answers that the order cannot be issued until after a judgment has been rendered that the grasshoppers should leave the country. If this was not done by the defendant in a specified term of days, the thunder of excommunication was to be thrown on the defendant.

A later jurist, Job Ludolf of Saxony, a man with the extraordinary knowledge of twenty-five languages, speaks in 1694 at some length against the proceedings just related. He declares himself to be pained by the lack of knowledge of the law of excommunication shown by Bartholomæus, and by the miserable arrangement of the process as proposed by him. Apparently it was at that time not the fashion of to-day among lawyers to begin with the slur of "a slight difference of opinion, as emitted by my honored friend on the other side." Ludolf says, when the greater excommunication is intended, the defendant has to be summoned before the court in the prescribed manner the first, the second, the third, and the fourth time, and then has to be brought before the court. Then comes the answer of the defendant. The argument and the principle of law must be given, so that it may appear whether the controversy consists in a difference about facts or law. It must be decided whether witnesses are needed, and on whom the burden of proof falls. Other parties interested in the case ought to be thought of: for instance, tame and wild birds should be heard, because they are in danger of being deprived instantaneously of their favorite food; the Acridophagi (grasshopper-eating people) should be heard, as they could otherwise take exceptions, and move the nullity of the case, or they could by appeal from the judgment, which injures other parties and is therefore unjust, suspend the execution of said judgment. Further, it would be unjust to compel grasshoppers to leave and to go to neighboring territories; and perhaps it would be more to the point to allow them to be eaten by any one who likes them. The proceeding proposed by Bartholomæus, says Ludolf, could never be proved to agree with the decree of the Holy See; and nothing like it is to be found in the Pontificale Romanum. There is a threefold excommunication, — the minor, the major, and the anathema (which is the end of all), — "that the culprit's body is given over to Satan, to save the spirit for the day of the last judgment." After all, it seems that lawsuits in those days have been very similar to those of to-day, — not shorter, not less complicated, except that nothing is mentioned about retainers and obligatory fees.

It is only right to state that Ludolf concludes with

the following words: 'But of what use is all this against disgusting beasts?' It is praiseworthy, that, among the twenty-five languages known by him, he chose just the one known by everybody to express feelings which could easily have been followed by more than dangerous consequences in those dark times.

In 1479 appeared in the canton of Berne, Switzerland, an enormous number of grubs; and it was feared that the whole crop would be destroyed: therefore the council of the commonwealth sent a deputation to the Archbishop of Lausanne, with the petition to banish the obnoxious creatures from the canton. Of course, it is not stated that the neighboring cantons had agreed to receive the grubs, but the archbishop seems not to have considered the incongruity of said petition. He gave an affirmative answer, and authorized the priest at Berne to impose the banishment of the grubs, providing for strict observance of the customs and laws. After a prayer, an advocate for the people was chosen. He notified the court of his appointment, and proposed the citation of the grubs. On a certain day some of the grubs were brought before the court, and their advocate chosen. The priest, followed by a large crowd of pious people in a solemn procession, went to the cemetery, to the fields, to the vineyards, and to the banks of the river, to serve the summons on the defendant. He delivered the following, at that time probably courteous, address as warning and as citation to the felons: —

"Ye hideous and degraded creatures, ye grubs! There was nothing like ye in the ark of Noah. By orders of my august superior, the archbishop of Lausanne, and in obedience to the holy church, I command ye all and every one to disappear, during the next six days, from every place where food grows for man or beast. If not obedient, I enjoin ye to appear on the sixth day, at one o'clock, afternoon, at Willisburg, before the Archbishop of Lausanne."

As some righteous people objected because the citation was not exactly made in the manner provided by law, the case was postponed, and, after a lawful citation, another day was named. Then the process began. The advocate chosen for the defendant was Jean Perrodet, a well-known dogmatical and obstinate disputant. Perhaps it will appear somewhat doubtful if the nomination of this advocate fulfilled exactly the demands of the law and custom of the time, as it is stated that Mr. Perrodet died a short time before his nomination. Nevertheless, the case and the complaint were read; and, as no defender appeared, the judgment was given for the plaintiff.

"We, Benedictus of Monferrand, Archbishop of Lausanne, condemn and excommunicate Ye obnoxious worms and grubs, that nothing shall be left of Ye, except such parts as can be useful to man."

The government ordered its officers to report the consequences of the excommunication; but the saucy chronicler says "that no success had been obtained — probably on account of the sins of the people." In the year 1338 immense swarms of grasshoppers came from Tartary to Hungary and Austria, and arrived the day of St. Bartholomew at Bozen, South

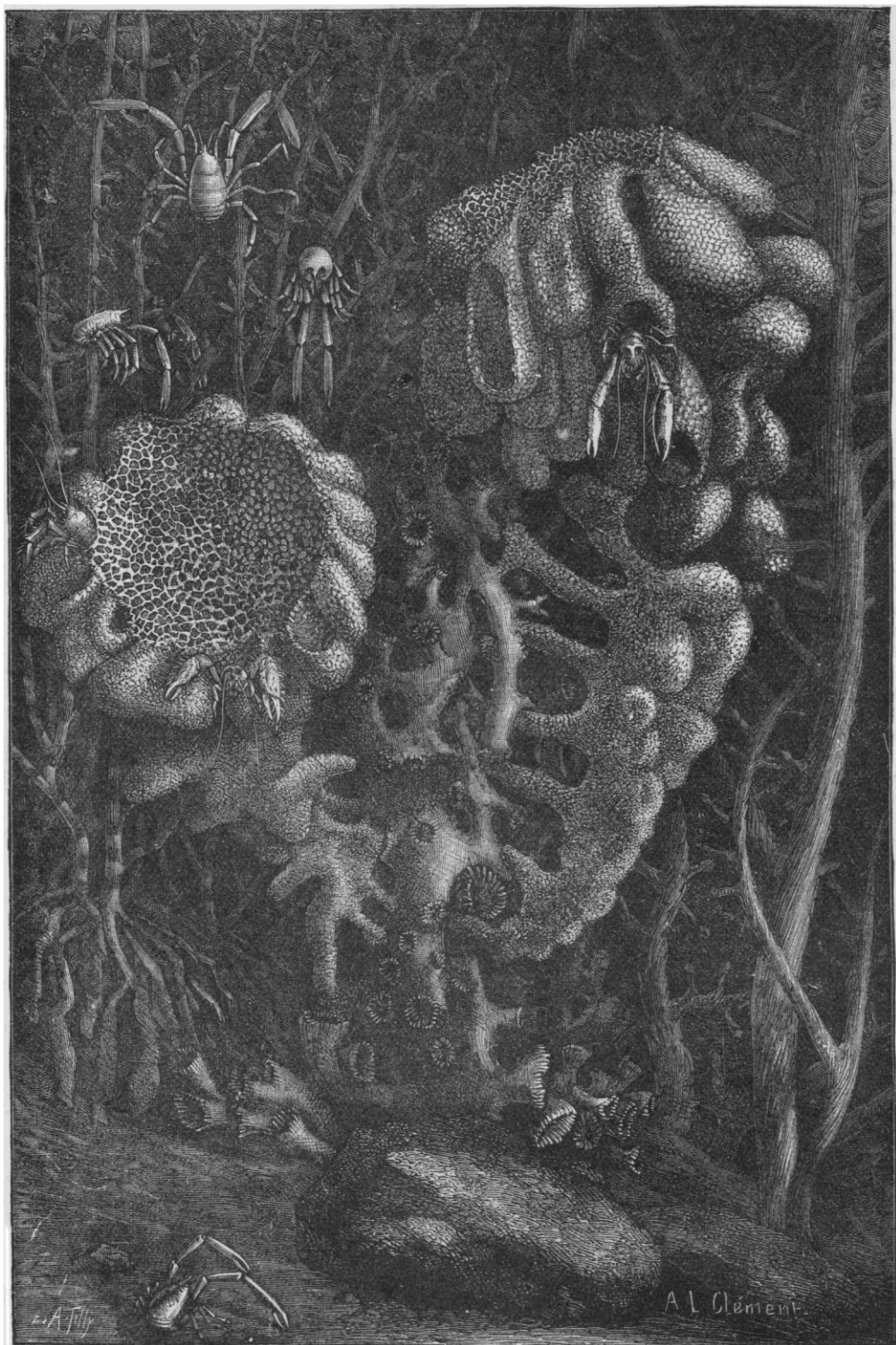


FIG. 1.—BOTTOM OF THE SEA AT A DEPTH OF TWELVE HUNDRED METRES, PEOPLED WITH COELENTERATES (MOPSEA), IN THE BRANCHES OF WHICH CRABS (GALATHEA) CRAWL ABOUT, AND BY SILICEOUS SPONGES ATTACHED TO CORALS (APHROCALLISTES), OR ANCHORED IN A VASE (CHONDROCLADIA).

Tyrol. The migration lasted seventeen days, from morning till night. The grasshoppers came down and ate every thing, grape-vines excepted. The swarms were so thick that the sun could not be seen, and they went farther to the shores of the Mediterranean. But the eggs and the young ones hatched from them were left behind: therefore a process was begun against them. The grasshoppers were condemned and excommunicated by the priest of Kaltern. The judgment was framed as follows:—

"As grasshoppers are obnoxious to the country and to men, be it resolved by the court that the priest shall, by candles burning from the pulpit, condemn them in the name of God, of his Son, and of the Holy Ghost."

A similar process was begun in the year 1516 against caterpillars in Troyes, France.

H. A. HAGEN.

THE LOWER FORMS OF LIFE DREDGED BY THE TALISMAN.¹

ACTINIAS, generally known as sea-anemones, attract attention both by the beauty of their forms and by their bright and varied colors. They are represented in the deepest waters, and some forms gathered on bottoms at from four thousand to five thousand metres possess a color as beautiful as that of the shore species.

Madrepores have a carbonate-of-lime skeleton. They are present sometimes in abundance to a depth of twenty-five hundred metres. Madrepore branchus generally covers large districts, and often the cords of trawls dragging on bottoms inhabited by *Lophelia* were torn in shreds. Solitary madrepores are very numerous, and especially affect muddy bottoms; and they have beautifully varied forms, some resembling a cup, others a horn, and still others having the form of flowers.

Various forms of alcyonarians, a special group of corals, were found at considerable depths. At the Cape Verde Islands the same species of coral which is found in the Mediterranean, and is of so great

commercial value, was found at a depth of a hundred metres. Between five hundred and six hundred metres there was found an interesting alcyonarian, *Corallioipsis Perieri*, which much resembled Dana's *Corallium secundum* of the Fiji Islands. *Isis* and *Mopseas* (see fig. 1), with slender rods formed of a series of calcareous cylinders supporting flower-like polyps with eight bi-pinnated tentacles, were taken at twenty-five hundred metres. Other forms, with gorgons, having a horny axis with metallic reflections like gold, people with their graceful forms the abysses of the ocean.

The sponges form one of the most interesting parts of the *Talisman* collection. One generally thinks of these as always possessing the characteristics of our commercial sponges. When one sees their wonderful tissues, formed of needles interwoven with glistening white rock-crystal, one is impressed, first with surprise, and then with admiration. Sponges are distributed from the coast to the greatest depths explored (five thousand and five metres). The littoral or shallow-water forms have a horny or calcareous skeleton, while those living at great depths have a skeleton formed of siliceous spicules, sometimes free, sometimes joined into a network. The most remarkable siliceous sponges are *Holtentia*, shaped like a bird's

nest, having at the circumference, or else only at the base, a long *chevelure* of siliceous threads, enabling it to anchor to the bottom; *Euplectelias*, having the form of a long trellised horn; and *Hyalonema* and *Chondrochladia* (see fig. 1), which thrust into the mire a strong twisted fringe of long spicules, resembling spun glass. Among the siliceous sponges, in which the spicules form a kind of network, *Aphrocalistes* is most remarkable, a specimen of which is represented in the



FIG. 2.—GLOBIGERINA AND ORBULINA, MUCH ENLARGED.
(From *Science et nature*.)

plate. In this sponge the needles form hexagonal meshes. Prolongations like glove-fingers, more or less distorted, detach themselves from the central part; and some of them, on coming in contact with solid bodies, or rocks, or corals, attach themselves very closely. The upper portion of the sponge (see fig. 1) is closed by an elegantly formed siliceous basket-work. As the colony increases, several of these trellises are formed.

The last animals to be mentioned, the Protozoa,

¹ Abridged from the French of H. FILHOL in *La Nature*. For previous notices see *Science*, Nos. 62, 68, 71, and 78.