

box, termed an "analyzer," contains the series of evaporating chambers, each communicating with the one below by means of a valved tube, which allows fluid to escape from the upper to the lower chamber only, and having the dividing partition of each chamber perforated with fine apertures, to allow the steam which is admitted from below to pass from chamber to chamber through the shallow layer of wash of each. A safety or escape valve is also fitted to each chamber. The already heated wash enters the uppermost of these chambers in a continuous regulated stream, is gradually deprived of its alcohol by the steam as it passes from chamber to chamber, and at last escapes into the lower large receiver, from which it flows off after attaining a certain depth. The third part of the apparatus also consists of a square upright box, termed a "condenser," divided into compartments by means of finely perforated plates, and in each chamber is a link of the tube which carries the cold wash onwards to supply the evaporating chambers just described. The alcoholic vapours escaping from the uppermost of the evaporating chambers are carried by pipes to the lowermost of these chambers, and are partly condensed by each successive chamber being colder than the one below it, in consequence of the wash entering the pipes from above, and only getting gradually heated by contact with the alcoholic vapour as it advances from chamber to chamber. As in the lowest of these chambers the heat is greatest, the alcoholic vapour or the condensed spirit contains a large amount of water; but as the chambers are successively cooler, the alcoholic vapour and condensed spirit at last arrive at a temperature only sufficient to convert spirit of the strength wished into vapour, and by an adaptation of valves, the substitution of an impervious partition for the perforated plate, and the admission of the alcoholic vapour into the chambers cooled by the passage of the cold wash in its contained pipes, that spirituous vapour is condensed, and the spirit is drawn off at one operation, of the very strength which it ought to have, and of the utmost purity.

Flat-bottomed and fire-heated stills are considered the best for the distillation of malt spirit, as by them the flavour is preserved. Coffey's still, on the other hand, is the best for the distillation of grain spirit, as by it a spirit is obtained almost entirely destitute of flavour, and of a strength varying from 55 to 70 over proof. Spirit produced of this high strength evaporates at such a low temperature that scarcely any of the volatile oils on which the peculiar flavour of spirits depends are evaporated with it, hence the reason why it is not adapted for the distillation of malt whisky, which requires a certain amount of these oils to give it its requisite flavour. The spirit produced by Coffey's still is, therefore, chiefly used for making gin and factitious brandy by the rectifiers, or for being mixed with malt whiskies by the wholesale dealers.

As the preparation of alcoholic spirit is the most important industry in which the operation of distillation occupies a prominent place, the establishments in which the manufacture is conducted are known as distilleries. But there are many other important industries in which distillation is an essential feature, being in them employed either for the separation, purification, or concentration of various products. A large proportion of the essential oils are, for example, obtained by the distillation of the substances containing them from water or a mixture of salt and water. The treatment of other bodies in which distillation plays a part will be found under their respective headings.

(W. D.—J. P.A.)

DISTRESS is one of the few cases in which the law still permits an injured person to take his remedy into his own hands. Other instances mentioned in the text-books are self-defence in the case of a personal assault, the

re seizure of property wrongfully taken away, the abatement of nuisances, &c. Distress differs from these as being a remedy for what is really a breach of contract, and it is the only case of the kind in which such a remedy is given. It is the right which the landlord has of seizing the personal chattels of his tenant for non-payment of rent. Cattle *damage feasant* (doing damage or trespassing upon a neighbour's land) may also be *distrained*, i.e., may be detained until satisfaction be rendered for the injury they have done. The cattle or other animals thus distrained are a mere pledge in the hands of the injured person, who has only power to retain them until the owner appear to make satisfaction for the mischief they have done. Distress for rent was also at one time regarded as a mere pledge or security; but the remedy, having been found to be speedy and efficacious, was rendered more perfect by enactments allowing the thing taken to be sold. Blackstone notes that the law of distresses in this respect "has been greatly altered within a few years last past." The legislature, in fact, converted an ancient right of personal redress into a powerful remedy for the exclusive benefit of a single class of creditors, viz., landlords. Now that the relation of landlord and tenant in England has come to be regarded as purely a matter of contract, the language of the law-books seems to be singularly inappropriate. The defaulting tenant is a "wrong-doer," the landlord is the "injured party;" any attempt to defeat the landlord's remedy by carrying off distrainable goods is denounced as "fraudulent and knavish." The operation of the law has, as we shall point out, been mitigated in one important respect by a recent Act, but it still remains an almost unique specimen of one-sided legislation.

At common law distress was said to be incident to *rent service*, and by particular reservation to rent charges; but by 4 Geo. II. c. 28 it was extended to *rent seek*, *rents of assize*, and chief rents (see **RENT**). It is therefore a general remedy for rent certain in arrear. All personal chattels are distrainable with the following exceptions:—1, things in which there can be no property, as animals *feræ naturæ*; 2, things in actual use; 3, things delivered to a person following a public trade, as a horse sent to be shod, &c.; 4, things already in the custody of the law; 5, money, unless placed in a sealed bag; 6, things which cannot be restored in as good a plight as when distrained; 7, fixtures; 8, beasts of the plough and instruments of husbandry; 9, instruments of a man's trade or profession. These exceptions, it will be seen, imply that the thing distrained is to be held as a pledge merely—not to be sold. They also imply that in general any chattels found on the land in question are to be available for the benefit of the landlord, whether they belong to the tenant or not. This principle worked with peculiar harshness in the case of lodgers, whose goods might be seized and sold for the payment of the rent due by their landlord to his superior landlord. Now, however, by the Lodgers' Goods Protection Act (34 and 35 Vict. c. 79), where a lodger's goods have been seized by the superior landlord the lodger may serve him with a notice stating that the intermediate landlord has no interest in the property seized, but that it is the property or in the lawful possession of the lodger, and setting forth the amount of the rent due by the lodger to his immediate landlord. On payment or tender of such rent the landlord cannot proceed with the distress against the goods in question. And originally the landlord could only seize things actually on the premises, so that the remedy might be defeated by the things being taken away. But by 9 Anne c. 14, and 11 Geo. II. c. 19, he may follow things fraudulently or clandestinely removed off the premises within thirty days after their removal, unless they have been in the meantime *bona fide* sold for a valuable consideration.

The sixth exception mentioned above was held to extend to sheaves of corn; but by 2 Will. and Mary c. 5, corn, when reaped, as well as hay, was made subject to distress.

Excessive or disproportionate distress exposes the distrainer to an action, and any irregularity formerly made the proceedings void *ab initio*, so that the remedy was attended with considerable risk. The statute 11 Geo. II. c. 19, before alluded to, in the interests of landlords, protected distresses for rent from the consequences of irregularity. In all cases of distress for rent, if the owner do not within

five days replevy the same with sufficient security, the thing distrained may be sold towards satisfaction of the rent and charges, and the surplus, if any, must be returned to the owner. To "replevy" is when the person distrained upon applies to the proper authority (the registrar of the county court) to have the thing returned to his own possession, on giving security to try the right of taking it in an action of replevin.

Duties and penalties imposed by Act of Parliament are sometimes enforced by distress.

DISTRIBUTION

THE subject specially discussed under this heading is the Distribution of Life, Animal and Vegetable, in Space and Time.

So long as each species of organism was supposed to have had an independent origin, the place it occupied on the earth's surface or the epoch where it first appeared had little significance. It was, indeed, perceived that the organization and constitution of each animal or plant must be adapted to the physical conditions in which it was placed; but this consideration only accounted for a few of the broader features of distribution, while the great body of the facts, their countless anomalies and curious details, remained wholly inexplicable. But the theory of evolution and gradual development of organic forms by descent and variation (some form of which is now universally accepted by men of science) completely changes the aspect of the question and invests the facts of distribution with special importance. The time when a group or a species first appeared, the place of its origin, and the area it now occupies upon the earth, become essential portions of the history of the universe. The course of study initiated and so largely developed by Mr Darwin has now shown us the marvellous interdependence of every part of nature. Not only is each organism necessarily related to and affected by all things, living and dead, that surround it, but every detail of form and structure, of colour, food, and habits, must—it is now held—have been developed in harmony with, and to a great extent as a result of, the organic and inorganic environments. Distribution becomes, therefore, as essential a part of the science of life as anatomy or physiology. It shows us, as it were, the form and structure of the life of the world considered as one vast organism, and it enables us to comprehend, however imperfectly, the processes of development and variation during past ages which have resulted in the actual state of things. It thus affords one of the best tests of the truth of our theories of development; because, the countless facts presented by the distribution of living things in present and past time must be explicable in accordance with any true theory, or at least must never directly contradict it.

From these indications of the scope and bearing of the subject, it will be seen that its full and adequate treatment would require volumes, and would necessarily involve an amount of details only suited to specialists in the various branches of natural history. All that can be attempted here is to give such a general sketch of the whole subject as to place the reader in possession of the main results arrived at, and enable him to comprehend the bearing of the more detailed information he may meet with elsewhere.

Arrangement of the Subject.—The three great heads under which the various matters connected with distribution may be classed are—1st, the geographical distribution of living organisms; 2d, the geographical distribution of extinct organisms; and 3d, the geological succession of the chief forms of life. Owing, however, to the fact that the study

of animals and of plants form very distinct sciences, and that there are special peculiarities in the phenomena presented by each which require to be carefully discriminated, it is found to be necessary to make a primary division of the subject into the distribution of animals and of plants respectively.

DISTRIBUTION OF ANIMALS.

The distribution of living animals in space naturally forms the first division of our subject, both because the phenomena are simpler and better known, and because it puts before us the main problems and difficulties to the solution of which the other divisions furnish the key. Animals may be roughly divided into two great series, broadly distinguished as regards their mode of life—the terrestrial and the aquatic; and for the purpose of our present study these divisions are of primary importance, because that element which limits the range of the one class offers a free passage to the migrations of the other, and *vice versa*. The first series is by far the most important. It is the best known, and includes almost all the higher animals; while the variety and interest of the various land divisions of the globe are far greater than in the case of that portion of its surface covered by water. We shall therefore consider first, and with a greater amount of detail, the distribution of land animals, including among them the fresh-water forms whose range is limited by the same general conditions.

THE GEOGRAPHICAL DISTRIBUTION OF LAND ANIMALS.

As soon as we begin to examine into the distribution of animals over the land surface of the globe, we meet with two very distinct and sometimes conflicting classes of facts, which may be conveniently grouped as *climatal* and *geographical* distribution. The first is the most obvious, and was long considered to be the most essential, since we find that not only many species, as the polar bear and musk sheep, are strictly limited to cold countries, and others, as the tapir, to warm, but that entire groups, as the sheep on the one hand and the trogons on the other, seem almost equally dependent on temperature. But when we come to compare the productions of the several continents, we find a set of differences in which climate appears to play no part. Thus, almost the whole of the warblers (*Sylviidae*) of Europe and North Asia are absent in similar climates in North America, their place being taken by a totally distinct family, the wood-warblers (*Mniotiltidae*); the ant-eaters, sloths, and tapirs of tropical America are replaced in tropical Africa by sardvarks (*Orycteropus*), lemurs, and hippopotami; while islands like Borneo and New Guinea, situated in the same ocean not very far apart, and whose climates and physical conditions are, as nearly as possible, identical, are yet as radically different in their chief forms of animal life as are remote countries situated respectively in the cold and tropi-