

## BOOK REVIEWS

## SCIENCE AND CRAFT

## Les Mécaniques de Galilée

Traduites de l'Italien par le P. Marin Mersenne. Edition critique par Bernard Rochot. (Le Mouvement des Idées au XVII<sup>e</sup> Siècle, 4.) Pp. 80. (Paris: Presses Universitaires de France, 1966.) 10 francs.

La Vie Domestique dans le Mâconnais Rural Préindustriel Par Susanne Tardieu. (Université de Paris. Travaux et Mémoires de l'Institut d'Ethnologie, Tome 69.) Pp. 525. (Paris: Institut d'Ethnologie, 1964.) 120 francs.

ENGLISH readers have a modern translation of this work of Galileo's published by Stillman Drake in 1960. *Le Meccaniche*, composed about 1600 for the benefit of Galileo's pupils at Padua, was only printed during his lifetime in this French version (it is not a straight translation) by Mersenne. Several manuscript copies of the original are known; one had come into Mersenne's hands by 1629. This little book is not to be numbered among Galileo's major creations, for it is after all no more than his version of the "treatise on the five simple machines" that had descended from the pseudo-Aristotelian *Mechanica*. Like everything Galileo wrote, it contained interesting touches; but it does not contain his discoveries in mechanics.

In 1629, although Galileo was world famous as an astronomer and controversialist, his fruitful studies in mechanics were known only to few intimate friends, although they were (probably) virtually completed by 1609. By 1634, when this little book of Mersenne's appeared, the position had changed doubly: since his trial and abjuration in the previous year Galileo had become a hero to some, a heresiarch to others, while the cause of this trouble, the *Dialogue on the Two Chief Systems of the World*, had also revealed his new mechanical notions for the first time.

It seems to have been the intention of Marin Mersenne, a great admirer of Galileo despite his holy orders, both to add distinction to the Italian's name and to make his work in mechanics better known in France, though indeed, in the present book, he could do little enough in the latter respect. Hence he was to take up this same task again, in *Les Nouvelles Pensées de Galilée* (1639).

The main historical interest of the little book here re-issued revolves around the "translator" rather than the original author. It was significant in introducing Galileo to a wider circle of Frenchmen, and for its clear expression, by Mersenne himself, of important mechanical principles. Nevertheless, it must be said that this role was both limited and local.

In her capacious volume, Mlle Tardieu, *chef de service* at the Musée des Arts et Traditions Populaires in Paris, gives the full scholarly treatment to her subject: the household equipment, and the daily life in which it figured, of the Mâconnais region in south central France—a vine-growing region the best known growth of which is Pouilly Fuissé, verging on the Beaujolais country to the south—before it was much affected by modern industrialization, that is roughly before 1900. Mlle Tardieu's scholarship does nothing to detract from the fascination of her material, compiled partly from objects in museums or still in use, partly from the recollections of aged villagers, and partly from notarial inventories of household goods. The point of the enquiry is, of course, that life

in this quiet, poor region (of whose place-names the *Oxford Atlas* lists only the towns of Mâcon and Cluny) changed little from the seventeenth century to within living memory; changes in detail occurred—the replacement of resin tapers by tin lamps fed first with rape-oil, then kerosene—and perhaps there was some slight secular increase in comfort, but basically the same harsh structure of peasant village life continued. The domestic interior remained barely furnished, even though earthenware partially supplanted pewter, unremitting toil in the fields went on with the same beasts and the same tools. The Mâconnais has declined in population since the end of the eighteenth century; if any one still wonders why all people at all ages have fled from country to town when they could, they might reflect on the winter "veillées" of the Mâconnais, where the fuelless families gathered turn by turn in each other's cowsheds, each family in turn providing the glimmer by which the women span. The reason for sitting together in the cowshed was to join the warmth of human bodies as closely packed as might be with that of the animals, and that of their dung left to heat by putrefaction. The same people were sometimes forced to set the bread-dough to rise in their beds, employing the same resource to keep the noon soup hot for supper.

In Britain we are historically more familiar with the social problems of industrialization: the factory, mine and slum. This book describes, with great wealth of solid information but without either romance or pathos, the reality of the "old world" which must be measured against the horrors of progress: a world in which, for the village, conscription might be a family tragedy, phylloxera a demographic disaster.

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## ABBE AND AFTER

## The Theory of the Microscope

By L. C. Martin. Pp. xiv + 488. (London and Glasgow: Blackie and Son, Ltd., 1966.) 100s. net.

It is very nearly a hundred years since Abbe formulated his diffraction theory of image formation. That hundred years has seen some tremendous advances in practical microscopy and other branches of optics. The best microscope objectives are not far short of practical perfection; new methods such as phase contrast and interference microscopy are commonplace and the development of lasers and holography offers exciting possibilities of further progress. It would be wrong to say that theory has lagged behind, but it is some measure of the complexity of the subject that this is the first comprehensive attempt to deal with the problem from the standpoint of modern wave optics.

The microscope is only an optical instrument, after all, but it is exceptional in that it uses lenses of unusually high aperture and is very much concerned with achieving the ultimate in resolving power. These peculiarities lead to problems not often encountered in other optical instruments, some of which are still unsolved. The first three chapters of this book are, in fact, a very useful introduction to diffraction theory and wave optics. The remaining five chapters deal with image formation with incoherent illumination, the theory of relative coherence, image formation with coherent illumination, the microscopy of phase objects and image formation in cases of partial coherence. There are several mathematical appendixes, including a useful one on Fourier series, integrals and transforms.

Abbe's work served to emphasize the importance of diffraction in image formation, but the narrow conservatism of some of his followers led to a long period of acrimonious discussion, much of it recorded in the *Journal of the Royal Microscopical Society*. Today, the development of partial coherence theory and the better