ematical treatment of generalized continua, from which many theories follow as special cases.

Besides the physical models mentioned which served as a basis for different continuum-mechanical representations, there is a number of other theories and treatments inspired by the problems of solid-state physics (Teodosiu [449]), or by the structure of technical materials (Misicu [306]) or by the mathematical possibilities for generalization of classical concepts (Grioli [179], Aero and Kuvshinskii [5]).

Granular media represent also the field in which the methods of generalized continuum mechanics are applied (Oshima [347]).

It is impossible to mention all contributors to the contemporary development of continuum mechanics, and we restricted this list only to some of them whose work most inspired further research.

3. Motion and Deformation

We shall regard material points as the fundamental entities of material bodies.

A body $B$ is a three-dimensional differentiable manifold, the elements of which are called material points. *

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* This definition of a body corresponds to the definition given by Truesdell and Noll [468]. Noll [330] developed a very general approach to continuum mechanics, but we are not going to follow
The material points $M_1, M_2, \ldots$ may be regarded as a set of abstract objects mentioned in the Appendix, section A1, so that the 1:1 correspondence of the points $M_k$ and of the points of a three-dimensional arithmetic space establishes a general material three-dimensional space. Since bodies are available to us in Euclidean space, we shall relate the points $M_k$ to the points of Euclidean space, establishing a 1:1 correspondence between the points $M_k$ of a body $B$ and points $\mathbf{x}$ of a region $R$ of this space. The numbers $x^i, i = 1, 2, 3$ represent coordinates of the material point $M$ and the points $\mathbf{x}$ are places in the space occupied by the point $M$.

Any triple of real numbers $x^i, i = 1, 2, 3$ may be regarded as an arithmetic point, which belongs to the arithmetic space $\mathbb{A}_3$. A 1:1 smooth correspondence between the material points $M$ of a body $B$ and arithmetic points $\mathbf{x}$, such that $X^k = X^k(M), K = 1, 2, 3$ represents a system of coordinates in which individual material points are characterized by their material coordinates $X^k, K = 1, 2, 3$.

A 1:1 correspondence between points $\mathbf{x}$ of a region $R$ of Euclidean space, and points $M$ of a body $B$ is the configuration of the body,

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it since it does not include plasticity and mostly is concerned with the non-polar materials, regarding elasticity, visco-elasticity and viscosity from a unique point of view. For the general approach to this theory, because of its highest mathematical rigour and for a very complete bibliography we refer the readers to the book by Truesdell and Noll [468].