Knowledge about the state of light polarization and changes of this state as a result of interaction with matter can provide a lot of information about the properties of the studied medium. It can also be used as a measuring tool to study the influence of various external factors (electric, magnetic fields, stresses) on these properties and thus to measure these factors. In the most general case, we examine or only the state of light polarization using the so-called analyzers, or we examine changes in the state of polarization after passing through the tested object. In the latter case, we need to control both the input polarization state (usually we generate certain states ourselves) and the state at the system's output. Treating the tested object as a "black box", we can always notice the same measurement scheme: an appropriate selection (generation) of polarization states at the input and an appropriate selection of analyzers at the output should enable the creation of equation systems that allow calculations of all the medium's parameters that interest us. Depending on the assumed formalism, these parameters have different names, but in the most popular terms they are: azimuth angle and elliptical angle, the so-called the medium's eigenwaves (waves with polarization states that do not change after passing through the medium), the transmission coefficients of both these waves (important for dichroic mediums) and the phase difference introduced by this medium after the transmission or reflection of the light wave from it. In the most general case, there are five such parameters, but the way they enter the final equations makes the determination of the required number of measurements and appropriate configurations of the input and output states highly dependent on many factors and subject to many limitations. Ideas and detailed solutions of specific measurement systems have been known for a long time, there are also general criteria that can be helpful in their design. These criteria are based primarily on the accuracy of measurements, but the following are also significant: minimization of the number of measurements, ease of automation, speed of operation, resistance to possible noises and interferences. Standard measuring systems were based on the use of elements that changed the state of light polarization by inserting and extending or azimuthally rotating the birefringent elements, introducing a known and strictly defined phase difference. This caused difficulties in automation and high instability of such systems, as well as the lack of repeatability of the obtained results. A breakthrough in polarization optics was the use of liquid crystal elements – they allowed for a controlled and continuous change of the introduced phase difference by changing the voltage applied to such an element. The "classic" liquid crystal modulators, unfortunately, do not allow the parameters (azimuth angle and elliptical angle) to be changed, which meant that either they had to be mechanically rotated again or a set of many such elements was used. A major breakthrough can and should be the use of phase modulators based on the so-called twisted nematic liquid crystals – now a change in the applied voltage causes changes in all polarization parameters of such a crystal, although it is still not possible to change each parameter separately. Due to the fact that the technology of producing such elements is still being developed, there are relatively few solutions using them in the literature. And this is the problem we want to deal with – researching the possibility of constructing new measurement systems that use twisted nematic liquid crystals. At the same time, we postulate that such elements can help to solve an additional, important problem: measuring the parameters of birefringent media to which we have limited access (e.g. the cornea of the eye), which means that it is necessary to use the same elements of the measuring system as a generator and polarization states analyzer at the same time. Still, the critical elements would be the accuracy and speed of the system (in vivo tests should not last too long) with a relatively simple and easy-to-analyze structure, consisting of as few elements as possible (costs!). Preliminary studies confirm that such solutions are possible with the use of "ordinary" (i.e. not twisted) liquid crystal modulators, and at the same time indicate potential weaknesses of such systems, which may be, for example, the limitation of the applicability of measurement methods to specific types of media (e.g. only linearly birefringent). These limitations result mainly from the impossibility of controlling the modulator's own wave parameters (azimuth angle and elliptical angle) without physically changing its orientation in the system, which is possible in the case of twisted nematics. Our goal will be to study the possibility of using phase modulators based on liquid crystals, including twisted nematics, for the construction of measuring systems, with particular emphasis on systems that will enable the measurement of "hard to reach" birefringent media, such as the cornea of the human eye. We want to focus primarily on systems that will use the same structural element simultaneously as a generator of polarization states and their analyzer. This will greatly simplify the size of the measurement system, its complexity and, possibly, costs. On the other hand, the necessity to use light-splitting elements in such measurement configurations will cause new problems to be solved and will force the development of new methods of processing the results, with particular emphasis on the calibration of the measurement system. Preliminary assumptions regarding such procedures have already been recognized by us during our research so far, and we are convinced that the use of twisted nematics will introduce a new quality to the construction of polarizing measuring systems.