competence and requires a concensus of my colleagues. This much is certain: sooner or later, a major astrophysical observatory will be functioning on it. In the interest of our science, it must be hoped that this occurs as soon as possible.

In defense of the right of the Central Asian Republics and Kazakhstan to a major astrophysical instrument, I beg to draw your attention to the following facts. This is not the time or place to speak of causes, but a situation has arisen in which all major reflectors built for Soviet astrophysics in recent decades have been located in a narrow strip of longitudes, for the most part in the Crimea and Caucasus. I have figured out the total area of the reflector mirrors, Schmidt cameras, and Maksutov telescopes 50 cm and more in diameter in operation in the European Soviet Union. It came out to 18.0 m^2. It will triple in the present five-year plan, reaching 51.6 m^2. The increase will result from commissioning of the Zelenchuk giant, which has a mirror 27 m^2 in area, and the Byurakan 260-centimeter telescope with a mirror area of 5.07 m^2. At the same time, reflectors with a total mirror area of only 1.11 m^2, i.e., only 2% of the total mirror area of the European instruments, are in operation on the territory of the Asiatic Soviet Union from the Urals to the Bering Sea.

In light of these data, and recognizing the high astroclimatic parameters of various sites in the Central Asian Republics and Kazakhstan, our claim to a major modern astrophysical instrument does not appear excessive or immodest.

M. S. Saidov. Joint Impurity Distributions in Semiconductors.

The paper shows, with supporting arguments, that the hypothesis of generalized moments $\bar{u} = \bar{\varphi} m$ ($\bar{u}$ is the average value of the potential energy of interaction of the atom or ion, $\bar{\varphi}$ is a quantity that characterizes the intensity of the phase molecular field, and $m = ez/r$ is the generalized moment, where e is the electronic charge, z is the valence of the ion, and r is the crystallographic radius) and further development of V. K. Semenchenko's molecular-statistical theory of surface effects in solutions[1] make it possible to explain and codify existing experimental data on the behavior of impurities in semiconductors and contribute to solution of the problem of simple and complex doping of semiconductors and metals.

Formulas are proposed for the solubilities, distribution coefficients, and diffusion and adsorption coefficients in multicomponent solid solutions based on elemental substances and compounds. It is shown that the formulas obtained are in most cases in qualitative agreement with available experimental data. For evaluation of impurity distributions in Cottrell clouds, the dislocation is regarded as a statistical analog of phase and the notion of linear sorption is introduced. Formulas are proposed for the linear sorption in multicomponent solid solutions based on elemental substances and compounds[2-5,7].

The paper points out the possibility of using the current-voltage characteristics of tunnel diodes to estimate the change in the solubilities of doping elements in semiconductors and for estimation of low solubilities in certain liquid metallic solutions. The influence of various impurities on the solubility of indium in solid germanium and on the solubilities of aluminum and boron in solid silicon is determined. The results obtained here confirm the proposed solubility formula in all cases[6].

Experimental data obtained by the author's coworkers on the influence of aluminum, gallium, indium, germanium, lead, gold, silver, and copper on the solubility of silicon in liquid tin at 800°C and in a broad range of concentrations are reported. These results are also explained qualitatively on the basis of the generalized moment and indicate the possibility that surface effects may influence the solution process at low concentrations of the third component.

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P. V. Shcheglov. Astroclimatic Conditions in Central Asia and Kazakhstan.

Progress in many rapidly developing branches of contemporary astronomy is closely related to the observation of extremely faint celestial objects in the optical band of the spectrum. Detailed study of extragalactic peculiar objects, observations of variable stars and of novae and supernovae in the nearest galaxies, investigation of extremely faint stars in open and globular clusters, which is necessary for refinement of theories of stellar evolution, and, finally, cosmological research—all of this falls far short of a complete listing of the most interesting problems whose solution might be approached by increasing the reach of optical telescopes.

Astronomy deals with very weak luminous fluxes. Objects can now be photographed with a radiant flux of $\sim (1-2) \times 10^{-3}$ quantum/cm^{2}sec ($\Delta\lambda = 10^3$ Å) at the surface of the earth and spectrographed with a flux of $10^{-4} - 5 \times 10^{-5}$ quantum/cm^{2}sec ($\Delta\lambda = 10$ Å). We note that astronomical radiation and image receivers are sensitive enough to register even fainter objects.

Let us consider the signal/noise ratio in the photography of point objects. Let D and f be the diameter and focal length of the telescope, β the diameter of the star image on the photographic plate, p the linear resolution of the emulsion, p/f the angular resolution of the system, n (photon/cm^{2}sec) the radiant flux from the object, S (photon/cm^{2}sec-sr) the radiant flux from the sky background, and m the number of photons per square centi-