R⟨benzene⟩NH–C–NH–C–NH⟨benzene⟩SO₂·NHC⟨...⟩

$$R = Cl; \quad m.p. \; 238°$$

Type B

R⟨benzene⟩NH–C–NH–C–NH⟨benzene⟩SO₂·NH·C⟨...⟩

$$R = Cl; \quad m.p. \; 225°$$

Type C

Further derivatives having different substituents in the N^1-aryl nucleus are being prepared. These compounds have been prepared by the interaction of arylcyanoguanidines[1,4] and hydrochloride of sulphamethazine or sulphamerazine in boiling 95 per cent. alcohol. These salts are white amorphous powders and are crystallised from aqueous dioxan. Details of the present work will be published elsewhere.

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FINITE PURE FLEXURE

ONE of the fundamental results in the mathematical theory of elasticity in the Bernoulli-Euler law of pure flexure which says that when a beam is bent by terminal couples the bending moment is proportional to the curvature of the central line. This law is widely used in the theory of flexure of prisms, continuous beams and bending of plates and rods. In the case of plates it is known that, if $2b$ is the thickness of the plate and ρ the radius of curvature in the plane of bending, then for small values of (b/ρ) the moments of the applied couples M_1, M_2 per unit length applied to the straight and circular edges are (D/ρ) and $(\eta D/\rho)$, η being Poisson's ratio and D the flexural rigidity of the plate. It will, therefore, be of interest to know what form these relations take for finite deflections when (b/ρ) is not small.

If a rectangular plate is bent by terminal couples into a cylindrical shape of inner radius a and outer radius b the theory of finite strain gives the values of the two couples M_1 and M_2 as[1]

$$M_1 = \mu \left[\tfrac{1}{2}(b^2 - a^2) - \frac{(2-c)(\log b - \log a)(ab)^{2-c}(b^c - a^c)}{c(b^{2-c} - a^{2-c})} \right] \quad (1.1)$$

$$M_2 = -\frac{\lambda}{a}\left[\tfrac{1}{3}(b^3 - a^3) - \tfrac{1}{2}\frac{2-c}{3-c}(b^2 - a^2)\cdot\frac{b^{3-c} - a^{3-c}}{b^{2-c} - a^{2-c}} \right], \quad (1.2)$$

where $c = (1 - 2\eta)/(1 - \eta)$.

If ρ is the curvature of the middle surface, we find, to the second order of (b/ρ)

$$M_1 = \frac{D}{\rho}\left[1 - \frac{1}{15}(2 - 6c + c^2)\frac{b^2}{\rho^2} \right] \quad (2.1)$$

$$M_2 = -\frac{\eta D}{\rho}\left[1 - \frac{1}{60}(13 - 7c)(1 - c)\frac{b^2}{\rho^2} \right] \quad (2.2)$$

which show that M_1 can be greater or less than D/ρ but $|M_2|$ is less than $\eta D/\rho$.

For $(b/\rho) = 0.2$, $c = \tfrac{1}{2}$ $(\eta = \tfrac{1}{3})$ we find from (1)

$$M_1 = 1.002 \, (D/\rho), \quad M_2 = -0.997 \, (\eta D/\rho).$$

It appears that the Bernouli-Euler theorem can also be used with sufficient accuracy for finite deflections when (b/ρ) is not small.

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WHY IS THE OCEAN BLUE ?

A NEW answer to this age-old question has been found as a by-product of some wartime research on the use of light rays in anti-submarine warfare. F. A. Jenkins (U. of Cal.) and I. S. Bowen (Mt. Wilson) in 1941 discovered that there exists in every cubic inch of clear ocean water about a million and a half dust-like particles, each about one fifty-thousandth of an inch in diameter. The suspended particles were discovered and counted with an ultra-microscope. These particles reflect sunlight back to the ocean surface. But the light that gets back to the surface has been filtered: water absorbs the red and yellow colours of light, leaving greens, blues, and violets, the combination of which is the indigo blue common to deep ocean water. Previously the explanation for this colour had been attributed to the scattering by molecules of water, just as the blue of the sky is explained by scattering due to air molecules. Less scientific explanations held that the ocean's colour was a reflection of the blue sky.

Jenkins and Bowen found that the billions of particles suspended in the ocean set a limit to penetration of light at 580 feet. This eliminated hopes of silhouetting submarines by dropping airplane flares below them, since it was impractical to use flares below about 200 feet. Scattering of light by the particles also prevented use of reflected light off submarines, similarly to the use of radio waves in radar.

—(Courtesy: *Bulletin of American Meteorological Society*, March 1947, p. 125.)