Preface:

The chemistry of heterocycles is one of the interesting branches of chemistry, for its theoretical implications and for the diversity of synthetic procedures. This has resulted in virtually limitless series of structurally novel synthetic heterocyclic compounds with a wide range of physical, chemical and biological properties, scanning a broad spectrum of reactivity. Heterocycles, widely distributed in nature as alkaloids, vitamins, antibiotics are important not only in the medicinal world, but also in the field of agriculture. The large majority of pharmacologically active compounds are synthetic heterocycles. Amongst the most important and interesting heterocyclic compounds are the ones that possess aromatic properties and many of them are five-membered rings. Of the large number of non-benzenoid aromatic heterocycles known, the mesoionic compounds have attracted attention, because of their structure, chemical properties and varied pharmacological properties. The most extensively studied class of mesoionic compounds is the "sydnone" An enormous amount of research on synthetic and pharmacological studies of sydnones has been reported from this laboratory during the last three decades. This present work is directed to further synthetic utility of sydnones for creative development of bisheterocycles of pharmacological interest.

The major part of this thesis includes use of 1,3-dipolar cycloaddition reactions to sydnones as well as the azide derivatives, resulting in the formation of a variety of biologically active heterocyclic ring systems.

The work carried out during the present research program is presented in six chapters preceded by a general introduction. The introductory part contains a general introduction to mesoionic compounds followed by chemistry of sydnones.

Chapter I describes the synthesis of some 2-[4-{(5-Aryl)-4,5-dihydro-1H-pyrazole-3-yl}]-phenyl-5,6-dihydro-2H-pyrazolo[3,4-d]pyridazine-4,7-diones and 1-[4-(2-Aryl-2,3-dihydro-benzo[b][1,4]thiazepin-4-yl)]-phenyl-5,6-dihydro-2H-pyrazolo[3,4-d]pyridazine-4,7-diones.

Chapter II deals with the use of sydnones for the preparation of some tetraheterocyclic systems with a combination of pyrrole, pyrazole, oxadiazole, thiadiazole and triazole rings.
Chapter III describes the synthesis of $1\{-4\{1\text{-Acetyl-(5-aryl)-4,5-dihydro-1H-pyrazol-3-yi}\}\}-1H$-pyrazole-3,4-bishydrazones.

Chapter IV deals with the synthesis of 1,2,4-triazole, thiazole and benzothiazole derivatives from $1\{-4\{2\text{-bromoacetyl}\text{-phenyl}\}\}-1H$-pyrazole-3,4-dicarboxylic acid dimethyl ester.

Chapter V describes the synthesis of pyrazoline and tetrazathiazepine derivatives of $1H$-pyrazole-3-carbonitriles.

Chapter VI Reactions of $3\{4\text{-Hydroxy-phenyl}\}-5\text{-methyl-3}[1,3,4]\text{-oxadiazol-2-one}$.

The spectral characterization and results of the antimicrobial studies of all these compounds are discussed in every chapter.

Literature references are cited at the end of each chapter.